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Contractors and Engineers Monthly

Vol. 45, No. 7

JULY, 1948

\$3 a Year, 50 Cents a Copy

Covering the Field

• The ARBA Meets

An account of the Convention program and Road Show exhibits (continued from C. & E. M., June) begins on this page.

• Hydraulic Road Fill

Lofty approach fills for a future high-level bridge are built with sand dredged from the river bottom. See page 2.

• Houston Expressway

Its design, dense embankments, and unique overpass piers are treated in a 3-part article and pix (pages 6, 76-77).

• Building New Hospital

A novel wind-bracing system and composite floor feature the new Veterans Hospital described on page 17.

• Bituminous Paving

A 6-lane road gets a new-look asphaltic-concrete pavement. See page 24.

A maintenance contract (page 57) lays 10 miles of plant-mix and rock asphalt.

• Concrete Paving

A 1½-mile section is added to a dual concrete road in R. I. See page 33.

In Kansas, a 13-mile job runs like clock-work. Methods told on page 79.

• Earth and Concrete Dam

An article on page 41 covers a New York State flood-control project through earth-moving and early concreting.

• Airport Construction

Runway grading, aggregate base course, and paving comprise a \$250,000 municipal-airport contract. See page 47.

• Gravel Secondary Road

The use of gravel for both base and surface courses—plus a tar surface treatment—marks a 2.6-mile job (page 54).

• County and Township Roads

A refresher paper on county maintenance methods is summarized on page 66.

A town highway department stabilizes gravel roads with rock salt (page 74).

How a county and its townships share in road financing is told on page 108.

• Bridge Construction

There's a story on page 68 of concrete-pier construction for a new toll bridge to replace a narrow wooden trestle.

• Road Maintenance

For a C. & E. M. survey of the damage last winter dished out to highways in all sections of the country, turn to page 86.

• Roadside Development

A resumé of recent advances in roadside work, especially in integrating it with highway design, appears on page 97.

• Dealer Activities

An equipment distributor's shop and maintenance service are covered, page 105.

General news of dealers is featured on page 133, in the section "Dealer Doings".

• Highway Shop

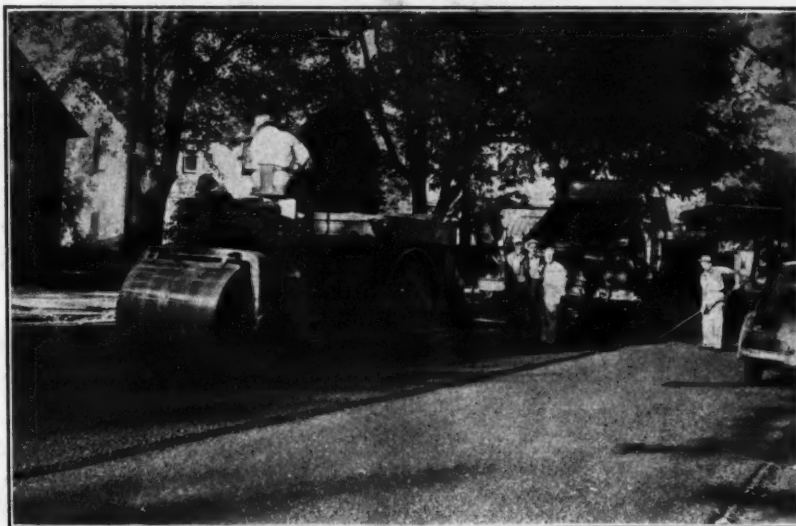
A 28-county highway division builds itself a modern brick and steel shop for equipment maintenance. See page 124.

(You will find "In This Issue" on page 4)



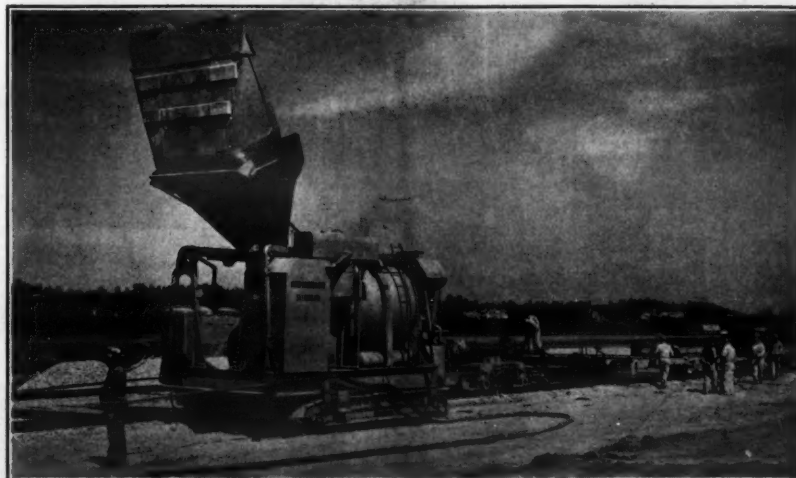
C. & E. M. Photo

Rock drilling for a new section of Massachusetts Route 128 was sublet to the Cabot Construction Co. Here Superintendent Bill Quick looks over two Ingersoll-Rand wagon drills at work on 24-foot lifters. An article on page 2 covers this part of the job, plus the hydraulic dredging required to build up approaches to a high bridge which will be built at some future date over the Annisquam River.



C. & E. M. Photo

A Buffalo-Springfield 10-ton tandem roller goes over a second course of binder laid down by an Adunn Black Top Paver on the streets of Elwood, Ind. This operation was part of the Wayne Paving, Inc., state highway maintenance contract described on page 57 of this issue—the improvement of a 10-mile section of Indiana State Route 28.



Massie-Missouri Resources Div. Photo

Paving line-up on the Jefferson City, Mo., Municipal Airport included a Koehring Twinbatch 34-E paver with a 35-foot boom and dual-gate bucket, a Blaw-Knox finishing machine, a Flex-Plane joint cutter, and a Koehring Longitudinal Finisher. Fred Weber's \$250,000 job for the City of Jefferson is reported on page 47.

ARBA Road Show And Convention

Road Builders Hold 45th Convention in Chicago; Biggest-Ever Display of Construction Equipment

ROAD builders from all parts of the U. S. A. and from fifty foreign countries are meeting in Chicago this month for the American Road Builders' Association Road Show and 45th Annual Convention. Since this is the first Road Show in 8 years, all eyes are focused on the giant 30-acre display of road-building and allied equipment at Soldier Field. This largest exhibit of such equipment ever assembled anywhere is expected to draw an attendance of over 100,000 visitors—road builders, airport contractors, engineers, and "sidewalk superintendents".

At the same time, the Association's convention is being held at the Hotel Stevens, where an interesting and informative program on all phases of the highway industry is being presented. The hours of the sessions have been arranged so that delegates will have a maximum amount of time to visit the Road Show exhibits.

Convention Program

Each day of the Convention and Road Show is dedicated to a particular group, starting with Distributors' Day on Friday, July 16. The following days include International Day, Educators' and ARBA Student Chapters' Day, Associated General Contractors' Day, ARBA Contractors' Day, County Day, Municipal and Airport Day, All States Day, and Chicago Day. Meetings of particular interest to these groups are scheduled for each of these days.

All of the ARBA Divisions are holding meetings during the ten days of the Convention, and the various committees are making their reports. These include topics such as the contract system vs. day labor; soils compaction; soil stabilization with asphalt, tar, cement, calcium chloride, and lime; snow removal and treatment of icy pavements; grade separations; local highway administration; and a variety of county highway department problems.

Under the sponsorship of the Educational Division, there are sessions on such important topics as earth-moving with shovels, cranes, and draglines; with scrapers, bulldozers, and graders; concrete and bituminous paving equipment; aggregate preparation; and concrete handling.

Special events include a reception for international guests on Saturday evening, July 17, the Road Builders' International Banquet at the Stevens Hotel on Tuesday, July 20, and several Division breakfasts.

Foreign Visitors

Representatives from Argentina, Aus-
(Continued on page 113)

River Sand Pumped Into Highway Fills

High Bridge Approaches Built Up by Hydraulic Dredging; Job Includes Rock and Peat Cuts

By WILLIAM H. QUIRK,
Eastern Editor

(Photo on page 1)

† A NEW high-level bridge is planned to carry Massachusetts Route 128, the Northern Circumferential Highway, over the Annisquam River at Gloucester, Mass. It has not yet reached the construction stage, but the lofty approach fills on either bank have taken shape, their white slopes glistening high above the waters. Clean, bright sand, hydraulically dredged from the river bottom, accounts for the whiteness of the banks. In this rocky, down-east coastal region where borrow material is conspicuous by its absence, suitable approach fills for the future bridge have been constructed by methods unique in the highway-engineering and construction field.

Some 500,000 yards of sand have been dredged from a maximum of 30 feet below sea level, in order to build embankments with a 2 to 1 slope and with a top elevation of 70. Besides the hydraulic-fill sections, the grading on this initial 2.4-mile stretch of dual highway runs the gamut of earth-work classification, varying from soft peat deposits to hard, granite ledge rock.

The Massachusetts Department of Public Works awarded the first contract on the new limited-access highway to the M. DeMatteo Construction Co. of Quincy, Mass., on its low bid of \$1,285,776. The job got under way in April, 1947, and was scheduled for com-

pletion in June, 1948. Two important phases of the construction were sublet. Drilling and blasting of all rock on the job, but not its excavation, was done by the Cabot Construction Co. of Kingston, N. Y. Dredging and placing material for the hydraulic fills was handled by the Eastern Engineering Co. of Atlantic City, N. J. The electric-powered dredge Queen, with a 16-inch pump and discharge line, was used in the work. The prime contractor, however, built the retaining dikes used in the construction of the fills.

Future Bridge

This entire contract relates to the future high-level 860-foot steel-arch and deck-plate girder bridge to be constructed over the Annisquam River at Gloucester in Essex County, connecting Cape Ann with the mainland of Massachusetts. (See C. & E. M., June, 1945, p. 44) The present highway bridge, located about 1½ miles below the new site, has only a 6-foot vertical clearance; as a result, the double-leaf roll-lift span must be continually raised and lowered for the passage of vessels bound between Annisquam and Gloucester harbors. Coastwise boats use this river-canal to save a long trip out in the Atlantic around Cape Ann.

War Department regulations required that the new bridge have a 65-foot vertical clearance over a 100-foot channel. Naturally this meant that the approaches must be correspondingly high. So a site was selected which took advantage of the only elevated topography in the area. The new bridge will span the channel between Rust Island, elevation 50, on the west bank, and 65-foot-high Ferry Hill on the east bank. Since these prominences were small in



C. & E. M. Photo
M. DeMatteo Construction Co. put a Lorain 75 dragline, with a 55-foot boom and Hendrix 1½-yard bucket, to work scooping sand from the center of the hydraulic fill to build retaining dikes 10 feet high.

area and dropped off sharply, they had to be built up in both elevation and expanse in order to serve as approaches to the new span. The deck of the new structure will be 90 feet above low water; it will carry two 25-foot roadways separated by a 4-foot concrete divisor, and will have a 4-foot walk on each side. The old bridge is only 33 feet wide.

The Northern Circumferential Highway, Massachusetts Route 128, leaves multi-lane U. S. 1 north of Boston near Lynnfield, and continues to the vicinity of Beverly. Eventually this dual-lane highway will be constructed still farther east to Cape Ann. The present grading contract includes a section of this expressway, 2.4 miles long, from Essex Avenue on Route 121 in West Gloucester, to Washington Street, Route 127, in Gloucester itself.

Future contracts on this section of the double-barrel highway will include the substructure and superstructure for the Annisquam River arch bridge, and four grade separations, three of which are west of the bridge, together with the

pavement on the main highway and its connections. The four smaller bridges, considered in order from west to east, include first a 62-foot concrete rigid-frame structure over Essex Avenue near the beginning of the project. Nearly a mile farther east the highway will cross Concord Street on a 50-foot steel-stringer bridge with a concrete deck. Next comes the Crafts Road underpass, a similar type of bridge with a 72-foot span. After the river crossing, Marsh Street on the east side will be bridged by a 37½-foot steel-stringer concrete-slab span. The project will end at the east with a traffic circle at Washington Street, Route 127.

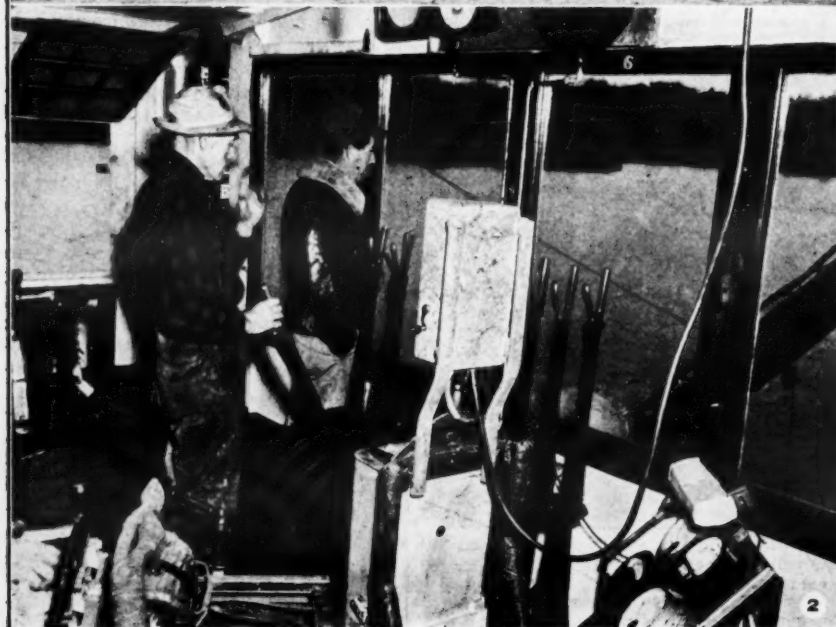
Grading Contract

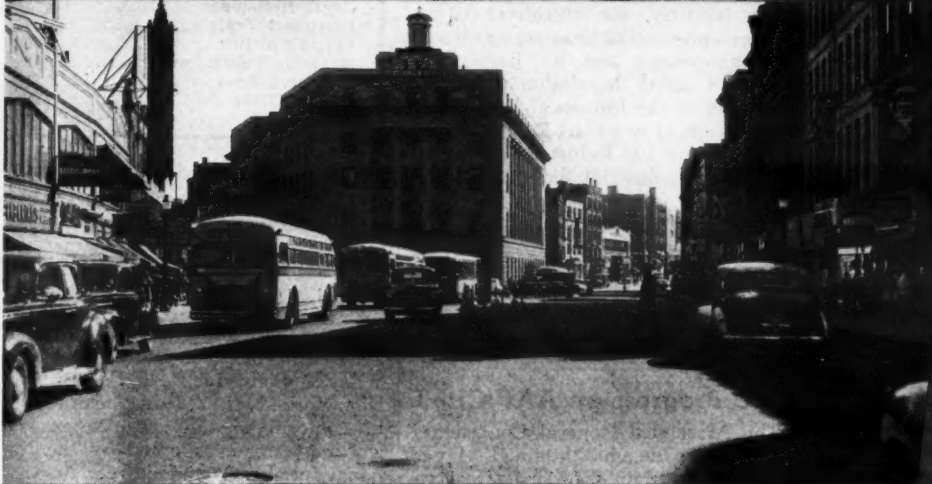
The new roadway is graded for two 24-foot pavements separated by a median strip 4 to 15 feet wide and elevated a minimum of 7 inches above the adjoining highway. The center strip is covered with 6 inches of loam. A 12-inch course of gravel will serve as a foundation for the new pavement, which

(Continued on page 12)

Photo 1, below, shows the dredge Queen which pumped 500,000 yards of sand from the Annisquam River bottom to build up approaches to the new high-level bridge which will be constructed across the river. In photo 2, Andy Berg operates the dredge while Captain DeMott Jones looks forward. In photo 3, Captain Jones inspects the Morris 16-inch pump and the Westinghouse main motor behind it. Photo 4 shows the bow of the Queen and part of her 45-foot-high A-frame and ladder. The Y-shaped land line of the dredge, photo 5, discharged between dikes of peat or rock on the lower lifts and sand dikes in the upper lifts of the fill.

C. & E. M. Photos





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The ARBA Road Show

This month the eyes of the road-building industry are turned to Chicago, where the greatest collection of highway-construction equipment ever assembled in one place is on display. Because of the war, this Road Show of the American Road Builders' Association at Soldier Field is the first such collective display of machinery since 1940.

The idea of exhibiting highway-construction tools each year at a fair or exposition dates back to 1909 when the first Road Show was held at Columbus, Ohio. This year's gathering promises to surpass all previous efforts both in the number and variety of exhibits, and in the attendance it will draw.

Industrial exhibits have a long and interesting history. During the Middle Ages merchant guilds proudly displayed their products, usually in one city where traders from all over the civilized world would come to barter. At these early fairs goods were generally sold, but as transportation improved over the years, people came to look, and left orders for future delivery. From this background the famous Leipzig Fair in Germany got its start in 1170, and has been running ever since although wars have suspended it on occasion. Now, within the Russian occupation zone, the Leipzig Fair has been revived and is operating this year on a modest scale.

The 1948 revival of the Road Show is really a World's Fair of the construction industry. At the 30-acre display of highway and airport-construction equipment, more than 300 manufacturers are represented. The number of visitors, according to estimates, will exceed 100,000, and will include road builders from all over the world. The

Road Show will be a new and stimulating experience to many of our own road builders—contractors, engineers, and highway officials—especially to those who have never before attended one of these affairs.

Like the traders and artisans of old, these construction men will inspect the new machines on display and will note the improvements, refinements, and innovations which the manufacturers demonstrate. They will decide what equipment they should have in order to do their jobs more efficiently and at lower costs by the substitution of modern machinery for hand labor. For the pattern of industrial progress down the centuries has been based on the selection of the best tools and materials to implement the know-how of their users.

In an industry that is spending over \$1,000,000,000 this year on the construction of 46,821 miles of state and Federal highways, the use of modern time-saving equipment is mandatory if the job is to be done. No one argues that highways are not needed. Even though actual highway expenditures alone represent more than 40 per cent of all public construction, more and better roads are a recognized necessity.

The return of the Road Show is a good thing for the industry. Its members, as they plod around Soldier Field, will make discoveries that will help them in their everyday work when they return home. Their horizons will be broadened as they see what American engineering genius has accomplished in the building of great and small machines to do a job more economically and efficiently. Let nothing again interrupt the continuity of this big exhibition.

One Concept of Public Relations

Just a few days ago, while covering one of the biggest dam-construction jobs in the country, we met one of the outstanding dam builders in the world today.

We were delighted. We said, "Our readers will be glad to know you're here. Tell us something about your latest exploits".

He replied, "I wish you wouldn't mention my name. Words are too precious for that—or they should be. If you have any words to spare, tell your readers the story behind this dam, and behind other public construction like it."

"Tell the people what good these projects do. Tell them how work today will make electric power, transportation, recreation for years to come. Show your readers that the work they're doing now is the heritage of generations to follow."

"Tell them that the future belongs only to people who prepare for it, and that this public work is preparation. Dollars spent wisely today on public

projects mean happier, safer living tomorrow.

"Keep personalities out of it. The job's the thing, and the people are entitled to know all the facts, unshaded, reported truthfully in good faith. That's public relations."

At a time when this magazine is urging public agencies and highway departments to do a better job of telling the public the facts, this advice is significant.

"The job's the thing. Keep personalities out of it!"

We think that an excellent concept of public relations.

Recently passed Federal Highway Act of 1948 provides \$450,000,000 a year for fiscal years 1950 and '51. Funds are to be matched on 50-50 basis as before. Of this sum, 45 per cent is for primary system; 30 per cent for secondary roads; 25 per cent for F-A system in urban areas. Other authorizations total \$127,000,000.

Western Conference Stresses Job Safety

Safety in construction was the predominant theme at the 10th Annual Western Safety Conference held in Los Angeles on June 16 to 18. Special panel and discussion groups dealt particularly with job safety.

A highlight of the conference was the exhibit of the latest developments in safety devices and equipment. The display was open to the general public and emphasized the ease with which safety can be attained when it is planned into any job or project.

Several prominent speakers discussed various phases of safety, including safety in construction, elements of safety as taught to apprentices, the viewpoint of management and labor on safety in industry, the objectives of an accident-prevention program as viewed by management and by labor, and trends in safety legislation. General Chairman of the Industrial Division of the Conference was Carl E. Johnson, of the Department of Industrial Relations, Division of Industrial Safety, State of California.

The Western Safety Conference area covers California, Oregon, Washington, Idaho, Utah, Nevada, Montana, Wyoming, Colorado, Arizona, New Mexico, British Columbia, Alaska, Hawaii, and lower California.

AGC Progress on AAP Cited

The Associated General Contractors of America, Inc., has attained 84 per cent of its goal in sponsoring reserve construction units in the Army Affiliation Program. In a report submitted to Secretary of the Army Kenneth C. Royall, the AGC pointed out that 84 of the requested 100 groups have been sponsored and that 33 of these are already activated.

The AGC officially embarked on its part in the program on September 30, 1947, when its Governing and Advisory Boards accepted the invitation to sponsor 100 units. The Organized Reserve units sponsored include: Engineer Construction Battalions, Engineer Aviation Battalions, Engineer Construction Groups, Engineer Port Construction and Repair Groups, and Engineer Aviation Groups.

The principal purpose of the AAP is to secure the cooperation of industry in organizing and training units composed

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of men qualified for the positions they will fill. These units are to be trained and to be available for immediate call in the event of a national emergency.

Text on Timber Design

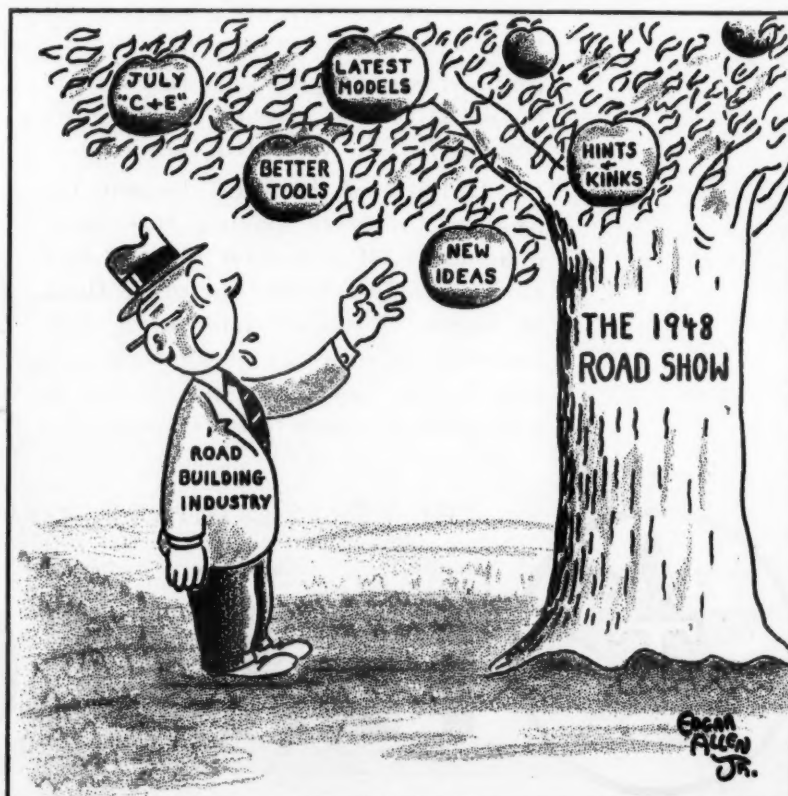
The second edition of "Modern Timber Design" has been published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. It has been revised to conform to the specifications for working stresses adopted by the National Lumber Manufacturers Association. Howard J. Hansen, C. E., Professor of Mechanics at the University of Florida, is the author.

The book discusses the characteristics and properties of wood, grading rules and working stresses, mechanics of wood, fastenings, beams and columns, wood trusses, timber decks and bridges, glued laminated construction, plywood, decay, wood-destroying organisms, and preservatives.

The appendix lists sizes based on American lumber standards, and properties of boards, dimensions, and timbers. It gives the nominal size, dressed size, area of section, moment of inertia, and section modulus. The appendix also covers patterns, definitions of terms used in describing standard grades for lumber, and standard abbreviations.

The 312-page book sells for \$4.50.

IN THE SHADE OF THE NEW APPLE TREE!



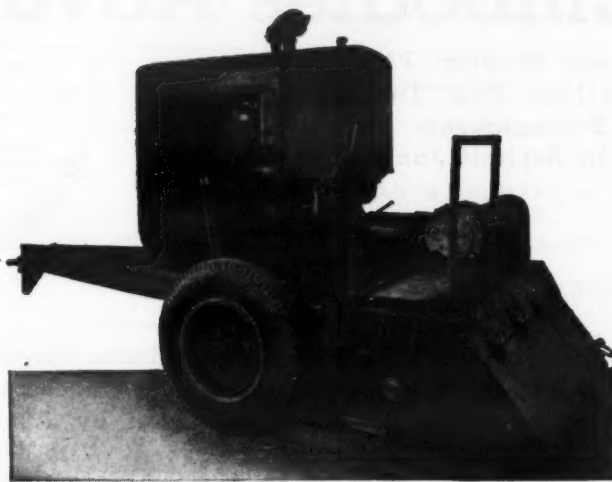
The WOOD PREPARIZER

- Scarifies and pulverizes old oil mat, asphalt and macadam pavements.
- Prepares soils for blending or mixing with liquid binders or soil cements.

The WOOD PREPARIZER is a heavy duty machine for roadbuilders and maintenance forces. It is engineered and built to withstand long and hard usage, with unequalled performance and economy. The WOOD PREPARIZER can be used on any pavement that could be scarified with a motor patrol. It will scarify and pulverize in one operation making it possible to reuse aggregate in the old wearing mats in the reconstruction of these roads.

Mounted on hydraulic jacks insuring perfect depth control makes it possible to peel off the mat and pulverize it without disturbing the road bed. Experience demonstrates its ability in conditioning all types of soils in base courses or wearing surfaces on all mixed-in-place jobs.

It is designed for towing with a crawler type tractor, and produced in two models: PT-600 which is tractor drawn and powered. Power is obtained through a standard power take-off. The P-600 is tractor drawn and has its own power plant for operation of rotor. Both machines are built 6' in width.



The WOOD ROADMIXER

The model 36 WOOD ROADMIXER builds all weather farm-to-market roads at a low initial cost and a low maintenance cost. Used for a surface construction or for stabilized bases. The model 36 produces a complete thorough mix in one pass using native or imported materials with any type of liquid binder. Producing from 100 to 125 tons of mix per hour. Self-propelled. One-man operated. It does the mixing work of over three road graders. Its initial cost and its operating cost is less per ton of capacity than any other equipment on the market. For low cost, all weather roads—"mix-in-place" with the model 36 WOOD ROADMIXER.

Stretch your highway dollar.



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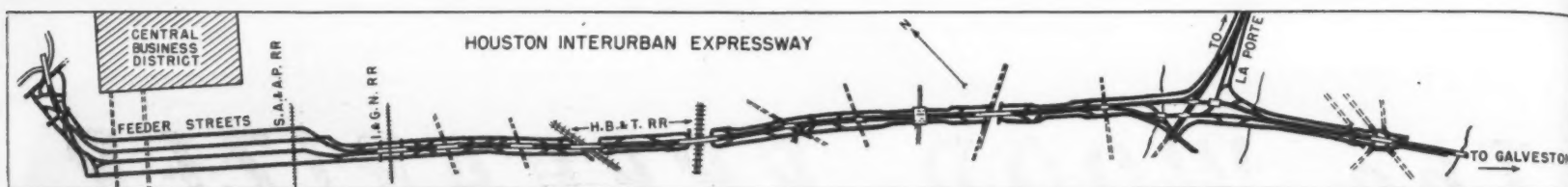


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describing Wood Roadmixers built in 2 models for all sizes of jobs. Designed to produce low-cost all weather roads.

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Fast New Urban Expressway Embodies Advanced Designs

Radical Modern Planning Specifies Top Densities For Embankments Encased In Asphalt Jackets

By RAYMOND P. DAY,
Western Editor

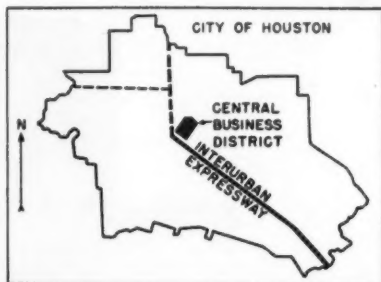
(Photos on pages 76 and 77)

♦ THERE is an old saying among construction men that a good engineer is like a turtle. He isn't going any place unless his neck is out. That saying could well apply to the advanced design and construction of the new Houston Urban Expressway.

Engineers of the Texas Highway Department and the Public Roads Administration are starting the first contracts on what will be a 70,000-vehicle-per-day expressway in the heart of Houston. They have not only considered the usual causes of highway failures; they are doing something about them.

Dirt embankments under the new thoroughfare are going in according to plan at 100 per cent of Proctor density—not under. And to make sure of that result immediately, while tractors and rollers worked each lift, a young laboratory engineer named F. A. Harris invented a handy field gadget to make

(Continued on next page)



Dense Embankment Supports Sub-Base Under Expressway; Protected by Asphalt Seal, Covered With Sand-Shell

♦ SUBGRADE embankments under the new Houston Urban Expressway were compacted to densities of 100 Proctor and over by conventional tractor and rolling equipment. The job, which consisted of 239,730 cubic yards of grading, wasn't easy. But when it is completed it will make a dirt job as mechanically perfect as has ever been done anywhere.

Specifications called for the natural ground underneath the embankments to be stripped to a depth of 6 inches, and rolled to develop a 100 per cent density

(Continued on page 126)

Bridge Foundations Are Built Rapidly by Unique Method of Drilling and Under-Reaming

♦ FOUNDATION design and pier construction for the various overpasses on the new Houston Urban Expressway are attracting the attention of contractors and engineers perhaps more than any other of the big project's unusual features. A unique system of concrete pedestal-type foundation piers, poured in place without form work, is being used.

The secret behind this work lies in the proper drilling and under-reaming of 30-inch drilled holes, which act within themselves as form work. Drilled to various depths between 15 and 40 feet, with 25 feet of depth a fair average, these holes reach down to the stiff, stable A-7 formation known locally as Beaumont clay.

While most bridges and many build-

ings near Houston rest on Beaumont clay, this is the first large application of drilling and under-reaming in connection with highway work.

Theoretical advantages of this type of construction were obvious. Backfill and open-cut excavation costs could be eliminated entirely. The work area could be kept clean. Delays due to bad weather would be minimized. And costs would be generally lower on the simplified operation. But the practical problem of obtaining a rig suitable for drilling and under-reaming remained.

That problem was solved when Jack McKinney, a foundation drilling contractor from Nacogdoches, Texas, offered a suitable arrangement to Brown

(Continued on page 137)

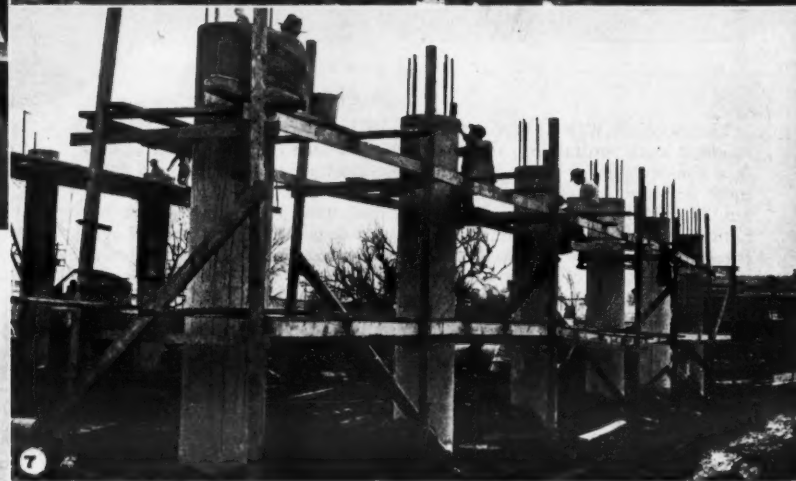
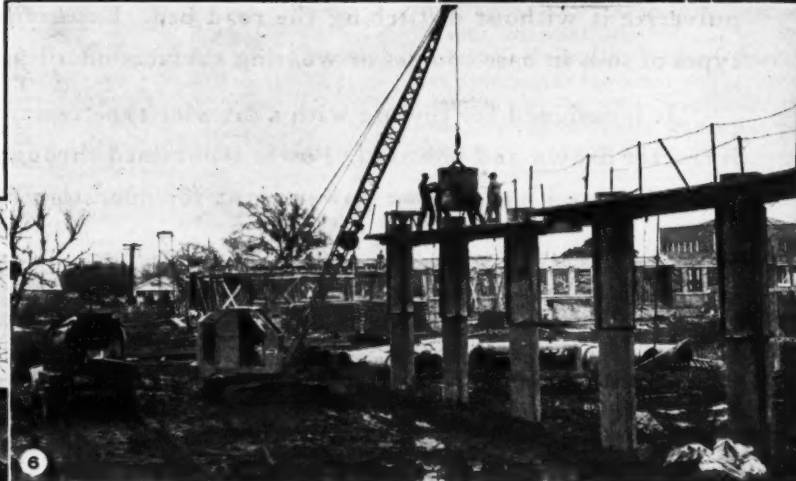
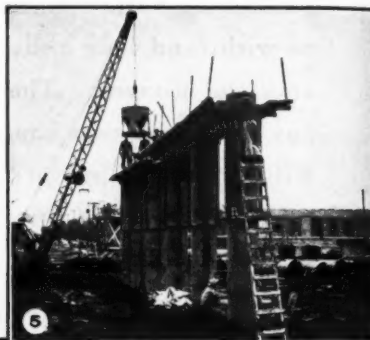
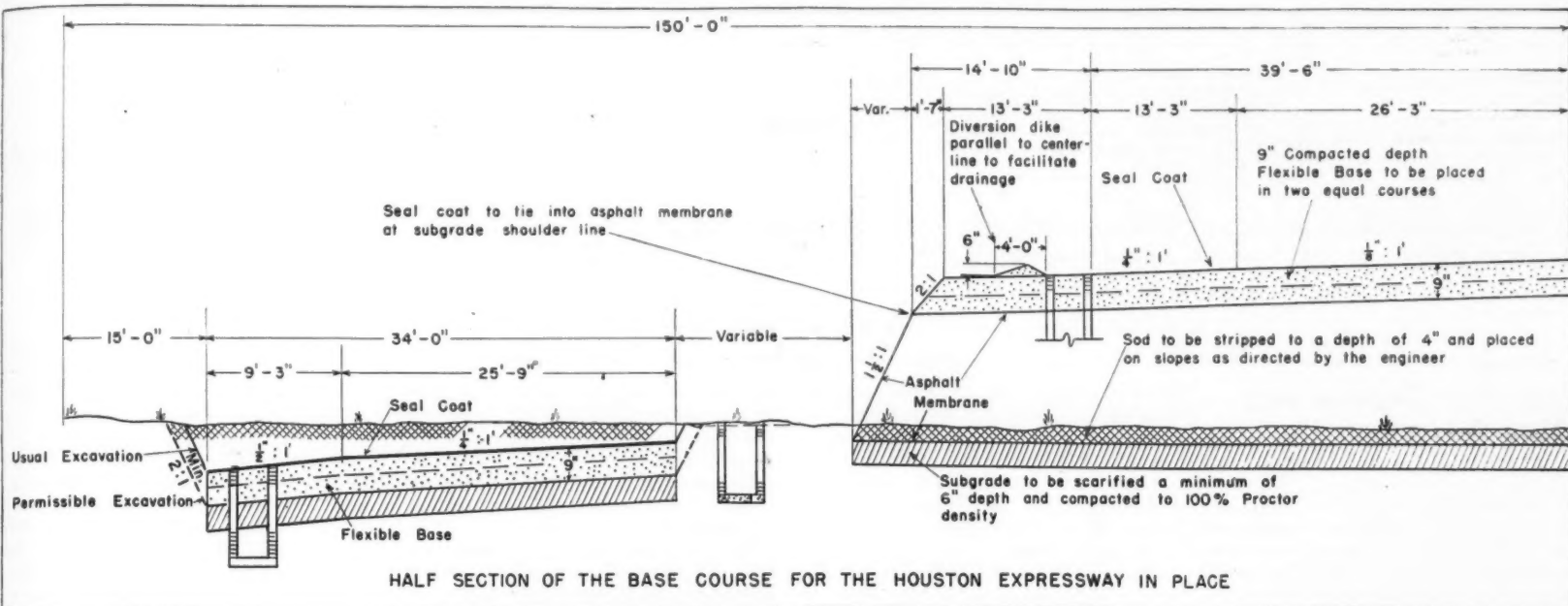


Photo 1 shows "Big John the Conqueror" which subcontractor Jack McKinney developed to drill holes for overpass pier foundations on the Houston Expressway. 2. A driller adjusts the reamer wings. 3. The under-reaming tool, with blades extended, which flared the bottom of the drilled hole to 6½ feet to form the base of the concrete pedestal. 4. These

cylindrical steel shell forms were used to pour the exposed columns. 5 and 6. An Insley crane with a Blaw-Knox 1-yard bucket transfers concrete from Jaeger Dual-Mix truck mixers to the hopper at the top of the pour. In photo 7, workmen dress the concrete. The last photo, 8, shows the finished column bents.

C. & E. M. Photos



the tests in a few minutes.

These same dense embankments are literally sealed in an asphalt envelope to prevent moisture from ever disturbing that excellent job of compaction. The asphalt seal is under, above, and on all sides of the embankment. Grass roots will never break the seal. The engineers took that possibility into account and put the grass cover 4 feet in the clear—on a special soil all its own, compacted to lighter density.

When foundation costs for overpasses built by any tradition or standard of years gone by threatened to be prohibitive, the engineers came up with one of their simplest and most radical methods—under-reamed foundations. Entire bents were started and finished in a day's work. This feature is attracting nationwide attention, and it is detailed in the third part of this article.

The new expressway is not a complicated, conglomerate mess of spaghetti at the intersections. There are no elaborate cloverleaves. It is simply a high-powered 6-lane divided expressway, with 32-foot service roads close by and a 4-street feeder system leading into it at the end near the Houston business district. It is becoming known as a pattern for other expressway design of the future west of the Mississippi.

The dubious credit for having his neck out the farthest must go to soft-spoken W. J. Van London, Engineer-Manager of the new Urban Expressway for the Texas State Highway Department. For Van London is the man who coordinated the dreams of many men with his own to make this project take shape. He is the man who worked with PRA officials and the City of Houston to integrate a thing of steel and concrete for the good of all. He whipped the problems of today with his mind on traffic problems a quarter of a century in the future.

Expressway Need Was Great

Houston is one of the fastest-growing cities in the south. Great industrial plants attracted by its shipping facilities located there. The population mushroomed to 500,000 and is headed for the 1,000,000 mark. Five great highways converge at Houston: U. S. 59, 75, 290, 90, and Texas State Route 35, which also pours its loads of traffic into the city.

By 1940, inter-city traffic in Houston was becoming more and more of a problem. Something had to be worked out. Downtown streets were blocked in peak hours. Parking was bad. In 1945, D. C. Greer, Texas State Highway Engineer at Austin, appointed Van London Engineer-Manager for a new expressway, with broad power and authority.

The immediate problem was to design and build a modern trafficway as rapidly

(Continued on next page)

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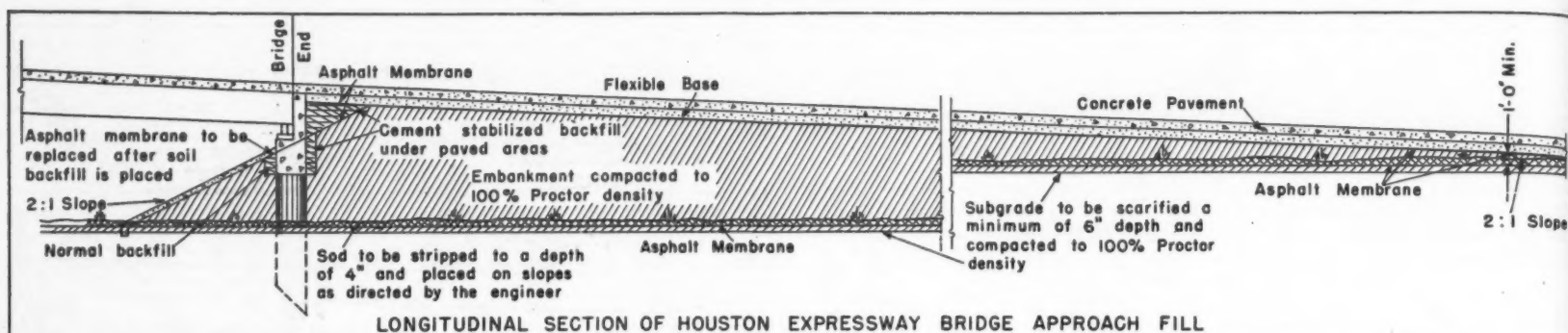
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LONGITUDINAL SECTION OF HOUSTON EXPRESSWAY BRIDGE APPROACH FILL

Fast New Expressway Has Advanced Designs

(Continued from preceding page)

and economically as possible, with provisions for future additions or improvements. This does not mean that it was undertaken a lane at a time. The entire thing, from the northwest end of the expressway at the central business district through the main part of town, was undertaken at once—a distance of about 4½ miles if you include the feeder system. Stage construction can now follow as rapidly as possible, and should make some parts of the new expressway available for limited use by the end of 1948.

Financing

The new expressway is being financed jointly by the State of Texas, the City of Houston, and the U. S. Public Roads Administration. The City of Houston agreed to purchase and make available all right-of-way, and to take care of the relocation of all utilities. It also assumed the cost of increasing storm-sewer size to handle drainage outside the limits of the expressway; this was established as being the right-of-way plus the frontage property 150 feet on each side.

The cost of the expressway proper, exclusive of grade separations at railroad crossings, is being shared equally by the PRA and the Texas Highway Department. All costs in connection with grade separations at railroad crossings are borne by the Public Roads Administration, in accordance with the Federal-Aid Highway Act of 1944.

City, state, and Federal agencies are working earnestly and in utmost harmony to push the construction as rapidly as possible. It was this same

kind of spirit which made the planning possible in remarkably short time.

Expressway Design

Construction costs have influenced the design of the new facility in almost every way except where quality of work is concerned.

The main roadway of the new traffic artery was designed on the basis of six 12-foot-wide express lanes, divided

by a 4-foot median strip. Raised emergency parking shoulders 10 feet wide flank each side of the expressway. A service road 32 feet wide parallels the expressway near by and permits vehicles to enter or leave it at designated intersections.

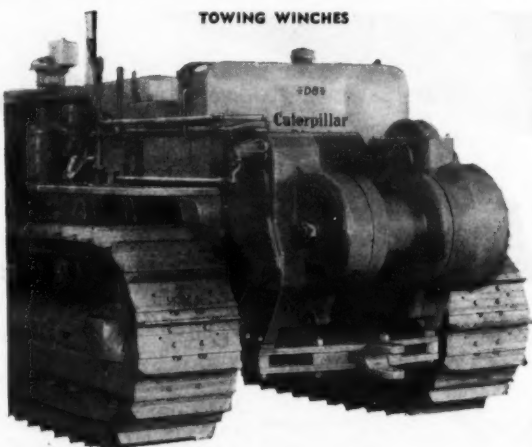
The pavement for service roads and the expressway proper is 8-inch portland-cement concrete, laid on a select course of compacted flexible-

base material 9 inches thick. Asphalt membrane also seals the flexible-base material.

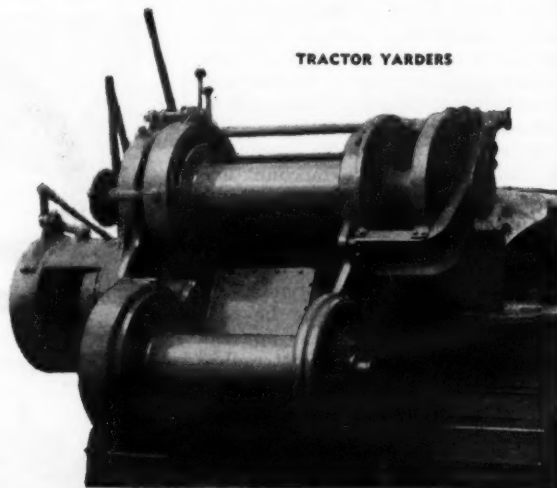
Near the Houston business district, 19 streets intersected the expressway route in a distance of about 1¼ miles. Traffic studies showed that 75 per cent of the traffic would enter or leave the expressway on those streets, with only 25 per cent passing from one side of

(Continued on next page)

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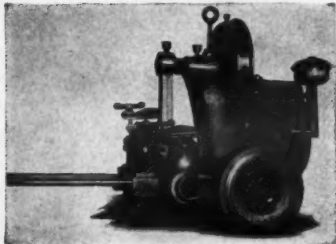
The current line of 29 tractor tools includes towing winches, yarders, donkeys, cranes, logging arches, sulkies and the Hystaway—the revolutionary tractor tool that combines clamshell, dragline, crane and bulldozer; all tractor mounted.

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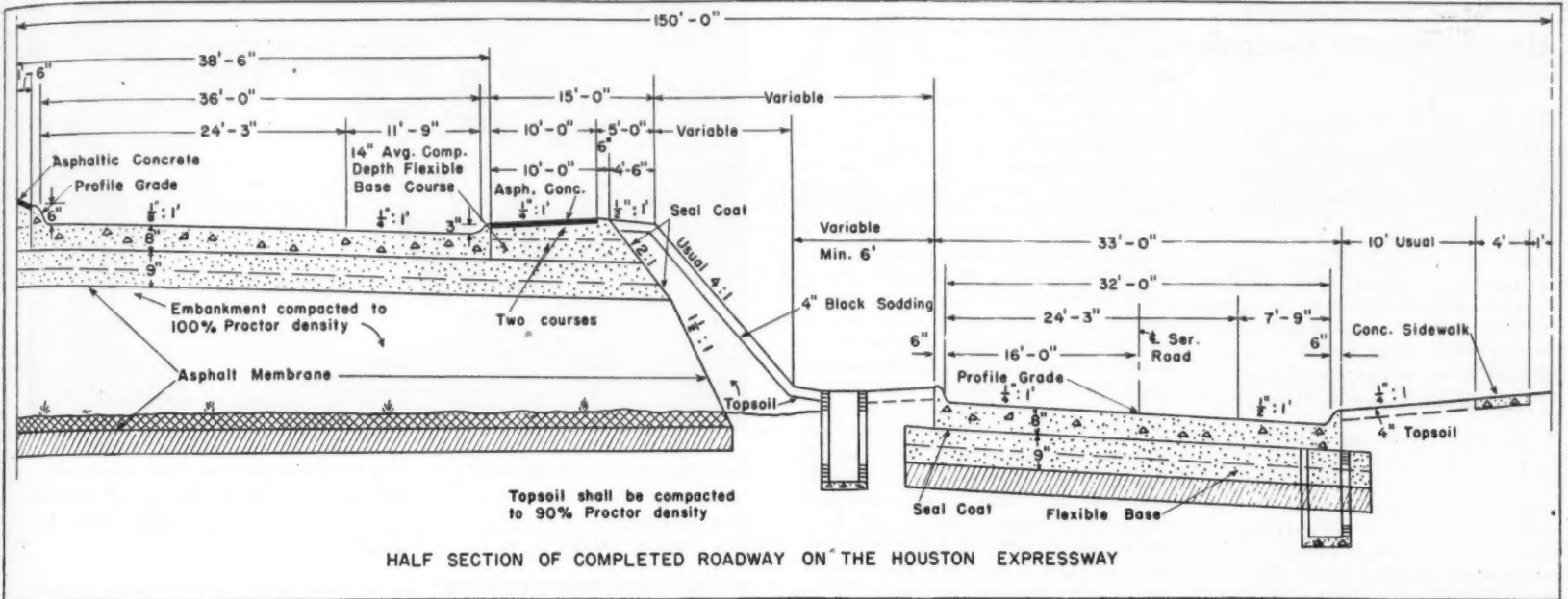
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the business area to the other. By 1957, Van London expects from 150,000 to 200,000 vehicles per day to use these streets which cross the expressway.

A freeway-type facility across those 19 streets would have to be elevated, and would cost \$10,000,000 at current prices. This fact influenced the design of the four-street feeder system for the present, to take traffic to and from the expressway. The two northerly streets carry westbound cars; the two southerly streets carry eastbound vehicles. There is, however, a future provision for construction of a connecting elevated structure.

The four feeder streets are being widened to 54 feet, giving three 12-foot traffic lanes and two 9-foot parking lanes per street. Traffic entering these feeder streets will turn in the direction traffic is moving. These feeder streets are all being resurfaced with hot-mix asphaltic concrete.

The engineers who designed the slab and determined the load-bearing values of the base, the sub-base, and the sub-grade or embankment, used the figure of 0.1 inch of slab deflection under a 14,000-pound wheel load. Professor Housel's perimeter-area ratio method was employed in determining bearing values.

Subgrade soils were tricky or downright bad. They were high in clay. The clay often had a jointed structure. Plasticity index ratings were 25 and over, with natural moisture greater than the plastic limit or optimum Proctor. A high ground-water table from 3 to 10 feet below grade also had to be taken into account.

The soils were sampled very carefully, of course, and density curves were plotted for moisture in varying percentages. These extensive initial studies by Soils Engineer Harris were responsible in large measure for the excellent field results later obtained.

(Continued on next page)

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It will cost you less to own and operate this new VANCO Mixer — the ideal unit for dozens of smaller construction jobs. Big mixer features — 3 h.p. engine, sturdy all-welded frame, heavy steel-bearing mounted bowl, discharge from either side, 6:00 x 16 tires, with retractable tow-bar.

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Fast New Expressway Has Advanced Designs

(Continued from preceding page)

Design of Overpasses

The new expressway intersects three railroad crossings and four principal streets. Overpass structures were designed at those points to carry the expressway overhead.

They were designed along architectural lines of sweeping, simple beauty, and appear extremely low to the casual eye. They have 50-foot I-beam-deck approach panels, supported by 7-column reinforced-concrete bents. These columns are cylindrical, and 30 inches in diameter.

Conventional methods would have been costly and delaying, because Houston has heavy rainfall and ground conditions are not always favorable to open pier excavations. A radical and different departure from usual bridge design was therefore decided upon. Why not bore a 30-inch hole down to the stiff A-7 clay bearing stratum, and under-ream it to give a wide bearing area at that point? Why not, indeed?

The solid clay will support from 4 to 5½ tons per square foot, requiring a 6½-foot-diameter pedestal under the columns. Skin friction could not be counted upon in this clay. The type of reamers the engineers had in mind had been developed and used to a limited extent before, but seldom on such a vast scale.

Adoption of this design permitted rapid work on foundations. Actual methods are detailed in the companion article, but there were no unsightly piles of excavated earth to clutter the work site, costly backfill around the piers was entirely eliminated, and the piers were poured the same day the holes were dug.

In designing these columns, test holes were sunk at the sites of overpasses. Undisturbed samples of the bearing clay were then taken, removed in cylinders 6 x 12 inches. Tri-axial tests for shear strength and other characteristics then furnished the design engineers with the information they needed to go ahead.

Another improved method of construction called for in this overpass design concerns the embankment treatment at the bridge abutments. Bridge approaches for many years, all over the nation, have been rough and subject to failures. Not so with those on the Houston job, if the thing works out as planned.

To start with, all embankments at the bridge abutments are finished first, before any abutment work is started. The earth fill is put in to a 2 to 1 slope at the abutment location.

The abutment columns are then drilled in, and the densely compacted embankment is trimmed back just far enough to back up the concrete part of the abutment. The small remaining cross section underneath the paved area then gets special treatment. Backfilling with earth is not permitted. Select sand-shell flexible-base material is stabilized by adding 3 bags of portland cement per cubic yard, and this material is tamped in. It sets up and gives an absolutely solid foundation underneath the slab—one which cannot give.

The asphalt membrane at abutments is also replaced to form a watertight seal at those points. Strangely enough, the equipment operators and contractors do not object to going to these pains. Once convinced of the earnest thought behind this planning, they go along with it willingly.

Traffic-Signal System

Unusual things are the rule rather than the exception on this Texas expressway. Among its unusual features was the design of an integrated system of signals. According to the Public Roads Administration and the various electrical manufacturers on the job,

this system is reported to be the largest in the United States. It is the first time the PRA has participated in traffic-signal construction.

The synchronized signal system involves 64 intersections over a distance of 4½ miles. It is so designed that, if properly operated, it will result in the minimum of vehicle stops and will direct and control the movement of large volumes of traffic as rapidly and freely as possible, commensurate with safety.

The traffic on the four-street feeder system, as well as on all cross streets, will be controlled and directed by a double-vision, automatic, synchronized, interconnected system of lights. The signals will be mounted on vertical posts so as to be visible from all approaches on the far right and near left of the driver. They will be adjustable, with four face units. The bottom face will be a directional arrow. All faces will have a hooded base light for illuminating an 18 x 24-inch information sign,

(Concluded on next page)



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Reports from similar types of jobs state that savings effected by this exclusive Ransome feature exceed \$100 daily—by eliminating an extra 1½ yd. crane, crane operator and up to 4 additional men.

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it's standard equipment only on Blue Brute Pavers!

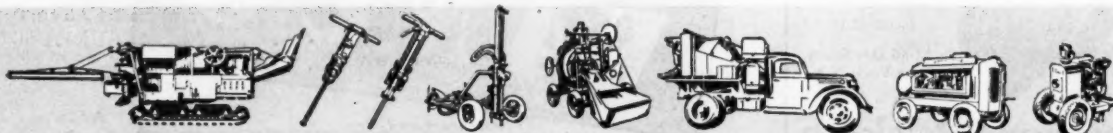
Many other advantages show why 34E Single or Dual Drum Pavers do more jobs—faster, better, for less cost. Your own jobs—paving or non-paving—will benefit by Ransome's famous mixing action, accurate water-measuring, all-weather batchmeter and foolproof, self-cleaning, fast-charging skip.

Get the whole story on Blue Brute Pavers from your nearby Worthington-Ransome Distributor, or write for Bulletin 208.

RS-6

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such as "Move on Arrow". A street name plate 5x25 inches, and where necessary a highway route marker, will be provided.

Three-dial secondary controllers will provide automatic adjustment of time cycles for variations in volume and direction of traffic, and permit or prohibit left turning as required to facilitate traffic movement. These controllers will also be equipped with 15 time-cycle gears, 5 for each dial. This will permit selected time cycles of 40, 50, 60, 70, and 80 seconds. And there will be flashing red and amber signals in either direction during low-traffic-density periods.

A master controller for the system will not only keep all the secondary controllers in synchronization, but will automatically change all controllers from Dial I to either Dial II or III as required to provide for the peak traffic periods. The master will also control the off-duty flashing period and the base-light circuit. This will be accomplished by the use of four synchronous time switches giving 3 "On" and 3 "Off" operations.

Turfing

The new expressway will truly be a thing of beauty when all the work is finished, for the designers have called for simple yet attractive cover on all the slopes.

To prevent any grass roots from ever penetrating the asphalt seal around the dense embankment, a plating course of earth 4 feet thick is being compacted from 80 to 90 per cent of Proctor density above the asphalt seal. The grass is then sown on the plating course.

On any slopes steeper than 6 to 1 at approaches to structures, block sodding with St. Augustine grass will prevent erosion. All other exposed areas will get Bermuda grass seed, with an asphalt mulch to prevent erosion while the grass gets started.

Storm-Sewer Work

Expressway drainage posed quite a problem in design. It was solved in much the same spirit that the rest of the problems were worked out. Engineers of the Texas Highway Department got together with men from the City Engineer's office of Houston, and together they worked out a comprehensive drainage plan for the entire district affected by the expressway.

The storm-sewer main and laterals were all laid ahead of the grading contracts, so that part of the work would not interfere with the high degree of compaction specified for the embankments.

Some of the expressway construction details are given in the companion articles in this issue, while the paving of the expressway and the feeder system will be described in our next issue. Brown & Root, Inc., is the prime contractor on its bid of \$6,000,000.

The finished improvement of U. S. 75 will be a monument to many men, with the name of W. J. Van London high on the list. J. C. Dingwall and H. W. Elder are his assistants as Supervising Urban Engineers, and share many of the problems.

Field Laboratory Trucks Speed Materials Testing

On-the-spot road tests of road-building materials are being undertaken by the Oklahoma State Highway Department. A fleet of eight field-laboratory trucks will operate out of division headquarters at Antlers, Ada, Perry, Clinton, Muskogee, Buffalo, Duncan, and Tulsa.

The trucks are equipped to run tests to determine whether gravel, sand, rock, and soils will meet the state standards. They will also serve to relieve the load on the central testing plant at Oklahoma City. The Department is concentrating more than ever on deter-

mining the types of soils which mix best.

Improved Lift Truck Has Crosswise Seat

A new idea in placement of the operator and his controls has been incorporated in the design of the Wagnermobile Duo-Way heavy-duty lift truck by Mixermobile Manufacturers, 6855 N. E. Halsey St., Portland, Oreg. Sitting crosswise in the machine, the operator watches the fore and aft ends of the vehicle by glancing from side to side; he doesn't have to twist his neck when traveling in reverse, the manufacturer points out.

The Wagnermobile Duo-Way lift truck has four operating speeds in either direction, ranging up to 20 mph forward

or 30 mph in reverse. Transporting may be done at these speeds, although the manufacturer recommends that the Wagnermobile be towed behind a truck for speeds up to 35 mph.

All controls are hydraulic except for the mechanically controlled carriage hoist. Loads are cable-lifted by means of a roller-bearing carriage on the hoisting track. The track is pivot-mounted at its base to provide for a tilt of 7 degrees forward and 15 degrees to the rear. The top section is designed to be folded down, and in this position the overall height of the machine is 9 feet 6 inches.

The unit is mounted on a tricycle running gear, and uses five 9:00 x 20 pneumatic tires. It has a front-wheel drive and a Timken Model L-DPH-100 differential. The tail wheel has a hydraulically powered steering arrangement. The Wagnermobile Duo-Way



The operator sits crosswise in the new Wagnermobile Duo-Way lift truck, so he can watch the front and back of his machine merely by glancing from side to side. The unit has a rated capacity of 16,000 pounds and four operating speeds in either direction.

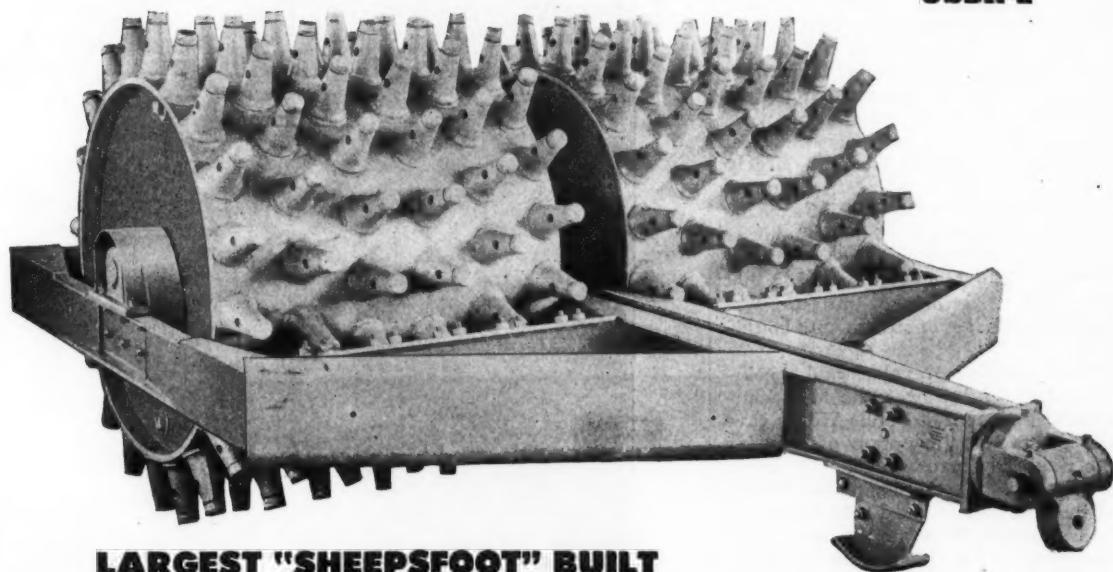
lift truck weighs 14,500 pounds and has a rated capacity of 16,000 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 15.

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SPECIFICATIONS—MODEL USBR-2

Diameter of Drum.....	60"	Length Overall (frame plus tongue).....	15'10"	Number of Feet on Ground at One Time, both drums.....	4
Diameter Overall.....	78 1/2"	Weight Empty.....	30,690 lbs.	Tamping Area, Each Foot.....	7.06 Sq. in.
Width Overall (frame).....	11'10"	Overall Length of Foot.....	8 1/4"	Tamper Feet per 1 sq. ft. of Drum Area*	1.52
Width of Each Drum.....	60"	Number of feet per Drum.....	120	Bearing Pressure per sq. in., empty.....	1090 lbs.
Number of Drums.....	2	Total Number of Feet per Roller.....	240	Bearing Pressure per sq. in., loaded with water.....	1420 lbs.
		Bearing Pressure per sq. in., loaded with water and sand.....	1600 lbs.		

*Shanks and removable tips of Cast Nickel Steel. Trailer sections and three drum units also available

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C. & E. M. Photo

At the gravel pit opened up for the Massachusetts Route 128 job, a North-west truck crane with a 50-foot boom and an Owen 3/4-yard clamshell bucket loads an International truck.

River Sand Pumped Into Highway Fills

(Continued from page 2)

will be macadam 7 inches thick and will have a crown of 1/4 inch to the foot. Thirteen-foot shoulders, on the outside only, will have a pitch of 1/2 inch to the foot, and will be covered with 2 inches of loam. The gravel foundation extends under the shoulders out to the slope line. Where the median strip is 8 feet wide or less, the edges will be paved with a granite sloped edging. Where the median strip is over 8 feet wide, the edges will be sodded. Guard rail will be placed outside the shoulders on the higher slopes.

The big question mark of the contract was where to obtain the 602,000 cubic yards of ordinary borrow needed for the approach fills. The peat and unclassified roadway excavation, including the rock, were already allocated. The only borrow pit in the vicinity was a small one, 5 miles away, which supplied material for the gravel foundation course but was not large enough to yield much else. A few thousand yards were scraped off some acres near the west end of the job. But as this area, largely residential, came under strict zoning ordinances, no great amount of excavation was permitted even if the material were available. The next-closest pit was 20 miles away, and even then land that could be used for that purpose was marked by ledges or strewn with boulders.

In drawing up the plans and specifications for the project, the Massachusetts Department of Public Works gave the contractor the option of securing the required borrow outside the limits of the roadway, or dredging the bottom of the Annisquam and Little Rivers for hydraulic fills. To retain the material on the required 2 to 1 slopes, the engineers recommended the use of portable wooden dikes of which 6,000 linear feet were required. These dikes would be constructed of 2-inch lumber, 2 feet high x 10 feet long, supported by 2-inch-diameter wrought-iron pipe driven 3 feet into the ground. The hydraulic fill was to be placed in terraces, with each higher row of dikes stepped in 4 feet.

The M. DeMatteo Construction Co.'s low bid on this contract was about \$300,000 less than the second low bidder's—partly as a result of its 75 cents per yard estimate on the common borrow. Its nearest competitor's price was \$1.18. The DeMatteo brothers, Martin and John, were counting on building the tall fills by the hydraulic method, but they ran into difficulties when they looked around for a dredging company to do the work. Concerns could not operate efficiently if they had to shut down their large dredges at frequent intervals while dikes were being built for the next lift. They were accustomed to having their dredges pump continually around the clock, discharging the material on very flat slopes such as 15 to

1 or thereabouts. But that method, naturally, could not be followed on a narrow highway right-of-way.

The best offer the DeMatteo brothers got from a large dredge operator was 85 cents a yard, 10 cents more than their own estimate. Moreover, the dredge in that case would not pump material to the fills, but to a stockpile. From there it would have to be picked up and transported to the highway by the prime contractor.

Small Dredge and Natural Dikes

Balked temporarily, the Quincy contractors approached their problem from another angle. They secured the services of a dredging concern, the Eastern Engineering Co. of Atlantic City, N. J., with a smaller dredge and crew. The latter company undertook to pump directly to the fills, with the DeMatteos taking care of the necessary dikes as it was placed. Naturally it was to the advantage of both prime and subcontractor that the work proceed with as little

delay as possible from the dike construction, to keep the dredge pumping.

But the 6,000 linear feet of timber barriers which were to serve as retaining dikes—with butt joints and iron supports, and tamped in place at the rear—were expensive to buy and costly to erect because of the great amount of hand labor involved. Instead of using this method, the contractor built retaining dikes along the toe of the slopes using whatever material was available from the adjacent excavation. Part of the new alignment was through a peat bog, so the heavy muck was dug out down to solid ground and used to fashion the retaining dikes along the sides. Rock from the ledge cuts was dumped in the hole resulting from the peat excavation.

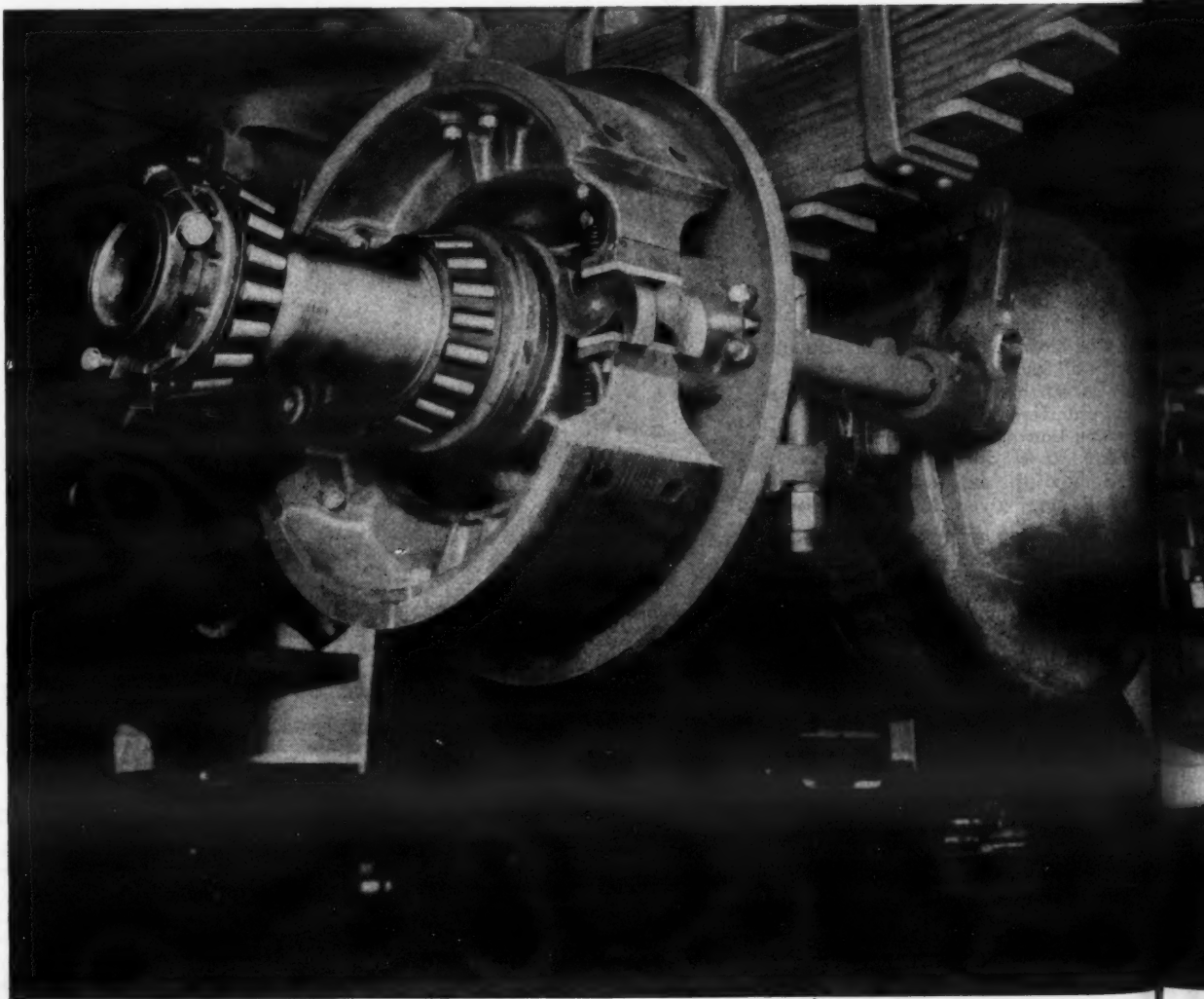
Rock, too, was used to build dikes along other sections of the embankments. In the case of rock, the sides of the dike had to be lined with dirt or topsoil to prevent the hydraulic fill from washing through in too great quantities. The dikes, which were built just inside

the toe of slopes, measured about 20 feet wide across the bottom, 10 feet wide on top, and averaged 10 feet in height. Hydraulic fill was pumped in between them until the area was filled with sand to within about 6 inches of the top.

Then new dikes were built along the edge of this first lift, but no longer with stone or peat. Instead, sand was dug out from the center of the initial placement, hollowing out the fill, and the material was piled up along the sides to form dikes 8 to 10 feet high. This work was done by a dragline, a Lorain 75 with a 55-foot boom and a Hendrix 1 1/2-yard bucket. When the machine was building the first set of sand dikes it worked on mats, as the low fill was slow to drain. The going was particularly wet in the peat dike section which retained the water. As the fills went higher, the drainage got better and better; mats for the dragline were no longer needed as the sand dried out quickly. The stability of the fills increased as the water drained off.

(Continued on next page)

REDUCE CHASSIS MAINTENANCE



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Texaco Star Theatre
every Wednesday night
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Evelyn Knight ...
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TEXACO



C. & E. M. Photos

Supervisory personnel on the DeMatteo highway job in Massachusetts included E. S. Foster, Jr., Resident Engineer (far left); Martin DeMatteo of the M. DeMatteo Construction Co., and his Superintendent, Roland S. Delaware. Above a Bucyrus-Erie 54-B 2½-yard shovel loads an end-dump Euclid with 10 yards of rock from a cut.

SAND WHEEL BEARING ECOSTS

**Get extra hundreds of miles of protection
between overhauls with Texaco Marfak
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The approach fills are on grades of 5 per cent ascending from the west until the bridge is gained; then the road drops down on a 4½ per cent grade as it continues eastward. With hydraulic fill, however, these grades were not followed. The embankments were built up fairly level by placing cross or back dikes along the ends which checked a too rapid run-off of hydraulic material, and gave the solids a chance to settle on the fills instead of being washed away. The sections worked on at a time averaged about 500 feet long.

The Dredge Queen

The all-electric dredge *Queen* of the Eastern Engineering Co. was built in Atlantic City, N. J., in 1946. Just before this job, it had been engaged in cleaning reservoirs in Philadelphia. It was dismantled there and shipped piecemeal on 24 railroad flat cars to Gloucester, where it was re-assembled on the banks of the Annisquam. The ways on which it was rebuilt consisted simply of three 24-inch steel I-beams with their mid-points on rocker arms. The beams were laid out at right angles to the river bank, and were equally spaced along the length of the hull; they were long enough to accommodate the width of the vessel. The center line of the dredge was offset 1 foot landward of the rocker arms. In this way the craft was easily launched by having a crane lift the end of the center I-beam, thus sliding the dredge down the bank into the river.

Six pontoons, each 30 x 10 x 6 feet deep and bolted together with 1-inch bolts, form the main hull—60 x 30 x 6 feet deep. A seventh pontoon, 20 x 10 x 6 feet, sticks out tail-like at the center of the stern to carry the spuds. Water is admitted to or pumped out of this pontoon in order to trim the vessel. The pontoons are constructed of 5/16-inch steel plates.

The Gloucester Light & Power Co. supplied the dredge with electric current off its 33,000-volt line, which was stepped down to 2,200 volts by a transformer located at the LePage glue factory on the river bank. From the transformer, 1½ miles of submarine cable ran out to the dredge, the last 750 feet carried on the floating pipe line. Because of this dependence on outside sources for power, the Eastern Engineering Co. expects to convert the *Queen* to diesel engines. On account of the drought in New England last autumn, the power companies were hard hit and were compelled to conserve power. Accordingly the dredge was without power four hours a day during peak load periods—9 a.m. to 11 a.m. and in the afternoon from 4 p.m. to 6 p.m.

Operating Machinery

At the bow of the dredge is a 45-foot—
(Continued on next page)

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

River Sand Pumped Into Highway Fills

(Continued from preceding page)

high A-frame, with each leg made from two all-steel ship booms, 12 to 18-inch diameter, bolted together into a single piece. The A-frame supports a 45-foot ladder at the end of which is a 5-foot-diameter 6-vane cutter head which can dig to a maximum depth of 32 feet. On this job the average digging was done around 20 feet. On the bow of the dredge at the other end of the ladder is a Westinghouse 60-hp motor turning at 695 rpm off a 220-volt line. Through a triple reduction gear the cutter revolves at 12 rpm.

From in back of the cutter the 18-inch intake line climbs the ladder to the deck, where by means of a rubber bonnet connection it enters the deck housing. Before the line reaches the pump it enters a stone trap where large stones, boulders, or rocks are caught and collected before they have a chance to cause damage or delays. The trap is simply a large box in the line, 6 feet long x 21 inches wide x 40 inches high, with three cross bars to stop the stones, chunks of wood, or whatever, before they get into the pump. The top of the trap has a lift which can be raised with a Wright 1-ton hoist so that the large pieces may be removed.

To the rear of the trap is a manhole in the line whose lid can also be removed with the overhead hoist if it, too, should get stopped up. Before the stone trap box was installed, delays in clearing out the line or the pump were fairly frequent. In dredging what was supposedly only sand, a great many boulders were constantly being picked up. Their presence was explained by their being picked up from around the shore line by winter ice sheets which carried them out in the river. When the ice melted, the rocks and boulders fell to the bottom. With the stone trap and manhole the dredge was able to run for long periods without having to shut down to clean out the line.

Aft of the stone box and to the sides is a Mead-Morrison 5-drum hoist powered by an Allis-Chalmers 30-hp motor. Altogether there are 10 levers, with a friction and brake line for each of the five operations. On the port side are the port haul or swing line, ladder hoist, and port spud line. Across on the starboard are the starboard haul or swing line, and the starboard spud line. The spud and ladder cables are 3/4-inch, while the swing lines are 1-inch. Roebling, Macwhyte, and American Steel & Wire Rope cables are in use on the dredge. The swing line has a total length of 400 feet fastened to two 1,500-pound single-fluke 2 x 3-foot anchors. This permits the dredge to swing on a 150-foot arc when digging. Both the hoist and cutter motors run on 220 volts.

Main Pump

The 18-inch intake line continues aft to a point about amidships where it enters a Morris 16-inch pump. Behind the pump is a thrust and then a line bearing to the main motor, a Westinghouse 500-hp unit operating on the 2,200-volt line which enters the dredge via the submarine cable. A bank of General Electric transformers along the port side of the deck house reduces this voltage to 220 for the other motors, and to 110 volts for the light circuit.

Alongside the transformers is a control switch for the main motor, while just forward of the pump is the control board for regulating the speed. A grid is provided for starting and running the main motor at low speeds. Forced air for cooling is furnished by an ILG 3-foot fan running on a 110-volt line. Aft on the starboard side is an International diesel-electric generator, used as a spare, to generate power at 240 volts for running all but the main motor, and also to furnish light.

A 16-inch outlet line leaves the main pump on the port side, and immediately makes a big vertical loop and heads aft towards the stern. By making this 5-foot loop, the outlet pipe is kept within the center pontoon, thus achieving a better distribution of weight over the dredge. The outlet pipe runs out on the tail pontoon leaving the dredge between the two spuds. The spuds are 45 feet long, weigh 8 tons each, and are made from hollow steel 20 inches in diameter. They are raised or lowered in a steel spud tower 30 feet high. The dredge can move ahead 3 feet at a time by swinging in a 100-foot arc, first on one spud and then the other.

Control House

Up forward on the upper deck is the dredge control house where the operator checks the workings of the big suction excavator. A cable from the ladder to the depth gage shows at what elevation the cutter is churning. A controller and switch for the cutter are within easy reach, and also a speed regulator

for the main motor. The swing movements and the spuds are controlled from this observation point. The vacuum on the intake line usually stands between 10 and 18 inches, while the pressure on the discharge line beyond the pump runs between 60 and 70 pounds to the square inch. In this sand the dredge pumped about 20 per cent solids. The three ammeters indicate averages of about 140 on the main motor, 50 on the cutter, and 40 to 50 on the swing.

Repairs were generally handled right on the dredge. Maintenance equipment includes a G-E 300-amp electric welder, an oxyacetylene welding set, a 6-inch bench grinder, and assorted small tools. For night work, floodlights were strung on the A-frame and the deck housing so that the operator could see where he was dredging. The average depth of cut over the river bottom was 13 feet.

From the stern, the 16-inch discharge line dropped down to the floating pontoon line by means of two rubber connections. The floating line was made up of 50-foot lengths of pipe, each sup-

ported on two cylinders, 15 feet long x 3 feet in diameter. Two 3/4-inch bands passed over the pipe, with the ends bolted to the cylinders. Rubber sleeves connected the floating pipe.

A catwalk was built on top of the pipe consisting of two 2 x 8's for a deck, and a 2 x 4 railing on one side. A ship-to-shore telephone line was strung along the walk so that the dredge captain or operator could be in communication with the shore crew at the discharge end of the line. A 110-volt light line was also carried on the walk, as well as the 2,200-volt submarine cable to keep it from being fouled by the dredge or the anchors as it was working.

Auxiliary floating equipment included a 20 x 30 x 3 1/2-foot-deep all-steel derrick barge, with an A-frame and a Le Roi 2-drum hoist powered by a gas engine. Two launches were used to carry supplies and personnel—the S-1, 24 feet long x 8-foot beam, with a 3-foot draft; and the S-2, 28 feet long x 9-foot beam, and a 4-foot draft.

(Continued on next page)

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Land Line

When the 750 feet of floating line reached the shore, the land line continued up to the beach. The land line was made up of 17-foot lengths of 16-inch pipe connected with male and female joints. The length of land line varied from 500 to 2,900 feet. At the discharge end a Y-connection was made with each leg consisting of two pipe lengths totaling 34 feet. These emptied out down the center of the roadbed between the retaining dikes.

To prevent the sand dikes from being eroded by the water, baffle boards were set at an angle along the sides to deflect the water. The baffles were 6 feet long x 20 inches high and were made of two 2 x 10's; they were placed about 8 feet apart. The water ran off the hydraulic fill through a vertical 20-inch-diameter sluice pipe shaped in the form of an L. The pipe was set at the lower end of the section being filled in, with the horizontal leg going out under the sand dike. As the fill built up, 2-foot sections were added to the top of the pipe.

Of the 602,000 cubic yards of borrow required for the project, the Queen pumped about 500,000 yards. Some of this was pumped with a maximum lift of 100 feet, from -30 elevation at the bottom of the river to elevation +71, the top of the east approach fill adjoining the new bridge. Usually the dredging did not go much below -20 feet, nor pump higher than +50 elevation, in order to prevent the sand from sliding back into the pump.

Dredging Record

Dredging started about the middle of last July. A 16-hour day was worked at first, but this was later increased to a 24-hour day divided into three shifts. A total of 25 comprised the dredge crew, with 7 in each of the night gangs and 11 working the day shift when the pipe line was being shifted. At night the discharge on the beach was lighted with four 300-watt floodlights; a 110-volt line was brought in to shore over the floating catwalk from the dredge. The lengths of land pipe were carried about on a truck and were set by hand.

The Queen worked only about half of the actual time spent at the site. Dredging was stopped, of course, when new dikes had to be built, when no power was available, when blows occurred in the dikes and made repairs necessary, or when the pipe lines were being shifted or lengthened. Under the sand in the river was a layer of clay, and when this was reached the dredging stopped, as only sand was wanted in the fills. Several successive rows of dikes were built and filled in between hydraulically, until the required grade was reached. The Queen averaged about 400 cubic yards an hour of embankment in place.

The white, very fine beach sand packed solidly and stood firm on the 2 to 1 slopes. No erosion or scouring occurred from the action of water. Some material was lost by reason of strong winds, but the slopes will be covered with either peat or impervious clay to prevent this. Stone gutters will also be built along the toe of the slopes.

The Eastern Engineering Co. was represented on the project by Captain DeMott Jones, Master of the Queen and General Superintendent. The two engineers on the Queen were Robert Eccles and Bill Ballinger. The last of the dredging was completed early in 1948. The Queen was then towed back to Atlantic City. No sleeping quarters or galley are provided on the dredge; the crew for the most part was based in Gloucester.

Rock Work

The Cabot Construction Co. of Kingston, N. Y., which has had much experience in tunnel work, drilled and blasted all the rock which was included in the item for unclassified excavation. The rock was found on both sides of the

river, and included not only granite ledge but also huge boulders. The mass of one such boulder projecting above ground was measured and found to be 215 cubic yards. One of the larger cuts was on Ferry Hill, at the east approach to the bridge, where 54,000 yards of ledge was removed. This spot was only 700 feet from a hospital, yet charges up to 1,800 pounds were set off without causing a disturbance, and producing only negligible vibrations. The full force of the blast was retarded through the use of as many as 9 or 10 delayed-action shots.

Rock removed from Ferry Hill was either backfilled along the section between Marsh and Washington Streets, where 50,000 yards of peat had been excavated to a maximum depth of 28

feet, or used to build dikes for the hydraulic fill along the eastern approach to the bridge. Similar disposition of the rock was made on the west end of the project.

Drilling equipment included 11 wagon drills—7 Ingersoll-Rands, 2 Worthingtons, 2 Sullivans—and 5 Ingersoll-Rand Jackhammers. Air was supplied by six compressors—three 500-cfm Ingersoll-Rands, two 315-cfm I-R's, and a Worthington 500-cfm unit. In the wagon drills, 1½-inch round steel was used in lengths beginning at 3 feet and increasing to 5, 7, 9, 11, and 15 feet, which was the maximum on vertical holes. Drill steel up to 24-foot lengths was used on some of the lifters. Timken bits were regular equipment on the job. For the wagon drills, these started at 2¾-inch

and decreased by ½'s to a minimum size of 1½ inch. In the Jackhammers, drill steel began at 2 feet and went up in 2-foot increments to a maximum of 12 feet.

Holes were drilled on an average of 3 to 3½-foot centers, mostly down holes with occasional lifters when necessary. One bit was usually good for a foot of granite before being replaced. Single wagon drills produced as much as 180 feet of drill holes in a work day of two 8-hour shifts. Hercules Gelamite No. 2, a 40 per cent dynamite in 1¼ x 8-inch sticks, was mostly used for charging the holes. Some 60 per cent strength was resorted to in a few instances. The average charge was ¾ pound to the foot of hole. The maximum shot on the

(Concluded on next page)



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River Sand Pumped Into Highway Fills

(Continued from preceding page)

job was 2,000 pounds. The average number of delays used was seven. The deepest rock cut, 30 feet, was taken down in two equal lifts.

For this job the Cabot Construction Co. used \$75,000 worth of drilling equipment, new for the most part, and a force averaging 45 men. The latter included 3 compressor operators, 10 drillers, 10 chuck tenders, 2 blasters, and the remainder were laborers or supervisory personnel. Besides Walter Dunham, President of the company, the supervisory personnel included William Quick, Superintendent; Walter Volk, Office Manager; John F. Elder, Engineer; and James E. Dolan, Master Mechanic.

Earth and Rock-Moving

For rock and earth-excavation the M. DeMatteo Construction Co. had a Bucyrus - Erie 54 - B 2½ - yard shovel, Northwest 2½ and 1½-yard shovels, and a P&H 2-yard shovel. The rock was hauled in four 10-yard end-dump Euclids; the average rock haul was only 500 feet. In building the rock dikes, the Euclids dumped the rock in windrows and dozers did the rest of the shaping. The peat was dug out and the dikes built by a Northwest 2½-yard dragline with an 80-foot boom. As mentioned before, the sand dikes were built by the 1½-yard Lorain dragline, occasionally assisted on the last two lifts by a Caterpillar D8 and bulldozer.

Five tractor-dozers were on the job, all Caterpillars—two D8's, two D7's, and a D6. When the DeMatteos were unable to obtain a dozer blade for one of their new D8 tractors, they made one right on the job. Using ¾ and ½-inch steel plate, George Curley, Master Mechanic, constructed a blade 11 feet long and 4 feet high, reinforced with 3 x 3 x ½-inch angles. The side arms consisted of 6 x 6 x ¾-inch angles, two on each side welded together to form a hollow rectangular bar. The welding was done with two electric welders—a Hobart 300-amp and a Lincoln 200-amp unit.

The dirt fills were placed in 1-foot lifts, and the ledge rock in 3-foot lifts, with dirt mixed in to fill up the voids. Equipment compaction was sufficient. The sand in the hydraulic fills needed no compaction. The borrow material taken from pits off the west end of the job was hauled in a fleet of 8-yard Sterling trucks; there were 11 of these on the job. The average borrow haul was 2 to 3 miles.

Gravel for the 12-inch foundation course was obtained from a pit in Essex, Mass., 5 miles from the west end of the project. The specifications required that no stone be over 6 inches in size, the material be graded down to fines, and that not more than 70 per cent should pass the ½-inch screen, not more than 50 per cent pass the No. 4, and not more than 5 per cent pass the No. 200. The gravel was excavated by a Northwest 1½-cubic-yard shovel.

The Sterlings and also some hired trucks hauled the gravel to the road where it was dumped and spread in two 6-inch lifts. The dozers and a Galion motor grader spread and shaped the material, and each lift was rolled by a 12-ton 3-wheel roller.

Drainage was installed by a new Northwest Model 25 truck crane equipped with both a ¾-cubic-yard Pullshovel attachment, and a 50-foot boom with an Owen ¾-yard clamshell.

Quantities and Personnel

The major items in the 2.4-mile contract for grading the new limited-access dual highway included the following:

Peat excavation	140,000 cu. yds.
Unclassified excavation	178,000 cu. yds.
Ordinary borrow	602,000 cu. yds.
Gravel borrow	85,500 cu. yds.

The above four items accounted for \$1,145,740 of the \$1,285,776 contract. Roland S. Delaware was Superintendent for M. DeMatteo Construction Co. on the Gloucester, Mass., project.

For the Massachusetts Department of Public Works, R. S. Foster, Jr., was Resident Engineer. The project is located in the Fifth District, with Charles A. Fritz, District Engineer, and Lewis J. Fritz, Construction Engineer, with headquarters at Beverly. The Department is headed by Philip H. Kitfield, Chief Engineer; Francis T. McAvoy is Construction Engineer.

Ceco Adds Madsen to Staff

Harry E. Madsen is a new member of the Chicago District Sales staff of Ceco Steel Products Corp. The Chicago district office is located at 1926 S. 52nd St. This company manufactures a line of metal windows, steel joists, steel roof deck, as well as reinforcing bars and other products used in reinforced-concrete construction.

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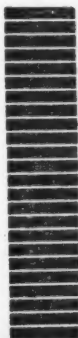
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Veterans Hospital Built 17 Floors High

**Steel Framework on Piles
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Light and Strong**

THE 17-story Veterans Hospital now under construction at Fort Hamilton, Brooklyn, N.Y., is scheduled for completion in the autumn of 1949. It will be the first of the modern new hospitals for Army veterans to be finished in the New York area. The 1,000-bed structure is being built under the supervision of the District Engineer of New York, Corps of Engineers, Department of the Army.

Supported on uniform-taper steel-shell piles filled with concrete, the large building has a structural-steel framework which will be enclosed by oyster-white brick walls. The steel for the tall structure was designed with novel wind-bracing features, and also to be an integral part of the composite-floor system. The latter features a layout of built-up hollow blocks encased by poured concrete which, while light in weight, has the required floor strength.

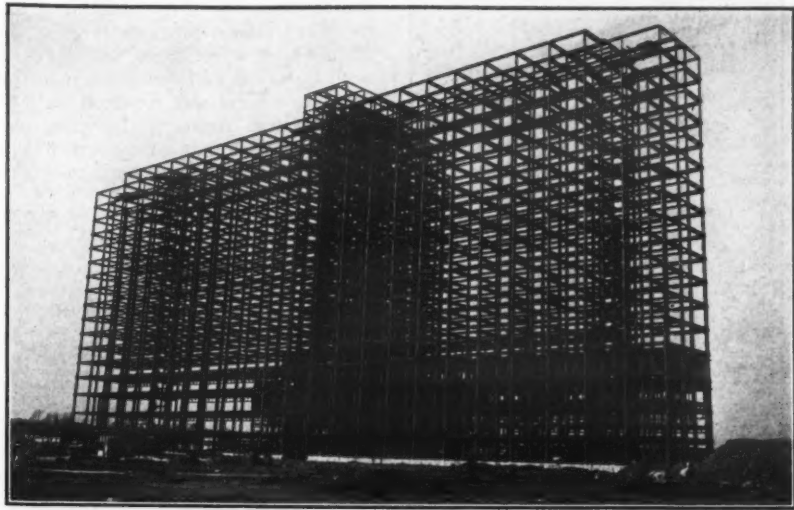
The structure consists of two parallel rectangular-shaped wings connected by a core to form a letter H, but with sides of unequal dimensions. The smaller side, 369 x 55 feet, is the administration wing, six stories high. The larger side, 489 feet 8 inches x 46 feet, is the 17-story hospital wing. The 80-foot square connecting core is also 17 stories high, and is cut to 60 feet above the fifth floor. It contains a bank of nine elevators—four for passengers and five for service. Besides this main elevator bank, the hospital is serviced by three additional elevators; three different stairways also go to the top of the building.

Included in the project is a service building off to one side of the hospital proper. It is of similar construction to the main building and measures 373 feet 7 inches x 95 feet 4 inches. It has one story, with a boiler section below ground level and a mezzanine above one section. Two underground tunnels, one for pipes to the administration wing and the other for service, connect to the main wing. The service building houses

the four oil-burning boilers that heat the hospital. It also contains a garage, laundry, and several maintenance shops—repair, carpenter, electrical, paint, and plumbing.

Excellent View

The hospital occupies a plot of ground 700 x 1,100 feet. At one time it was a part of the Fort Hamilton U. S. Government Reservation on which fifty barracks buildings were set up during World War II. They have since been razed for their lumber. Entrance to the hospital is through a two-level structure with approach ramps at the front of the administration wing. The main hospital wing is long and narrow and faces directly south so that every portion of it will get the maximum of sun-



C. & E. M. Photo

From the south side, the steel framework for the new Veterans Hospital in Brooklyn, N. Y., looks like a giant honeycomb.

light and fresh air, aided by canopy deflectors on each floor. From its southern exposure a sweeping view is obtained (Continued on next page)



TO PROVIDE more effective coverage, better service and additional technical assistance in the use of hard-facing alloys, Stooddy Company announces certain changes in its distributor organization. The accompanying list contains the names of principal distributors throughout the United States and Canada.

IN ADDITION TO THESE DISTRIBUTORS, local dealers in industrial and agricultural areas handle Stooddy products. For the name of your local dealer, write or phone the distributor nearest you.



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C. & E. M. Photo
Here are John Paterno (left), Superintendent for Cauldwell-Wingate on the Veterans Hospital project, and Charles S. Power, Chief Engineer.

Veterans Hospital Built 17 Floors High

(Continued from preceding page)

of Lower New York Bay, with the Narrows leading to the Upper Bay on the right, and Gravesend Bay stretching down to Coney Island on the left. Sun decks are at each end of the hospital wing at the seventeenth floor.

When completed, the hospital project will cost in the neighborhood of \$16,679,840. Cauldwell-Wingate Co. of New York City is the general contractor on both the main and service buildings. Its \$14,700,000 contract does not include, however, the steel framework, landscaping the site, or the actual hospital equipment. The latter will, in general, be furnished by the Government. The Bethlehem Steel Co. of Bethlehem, Pa., was awarded the contract for fabricating and erecting the structural steel on its low bid of \$1,200,000. Skidmore, Owings, & Merrill of New York City is the architect.

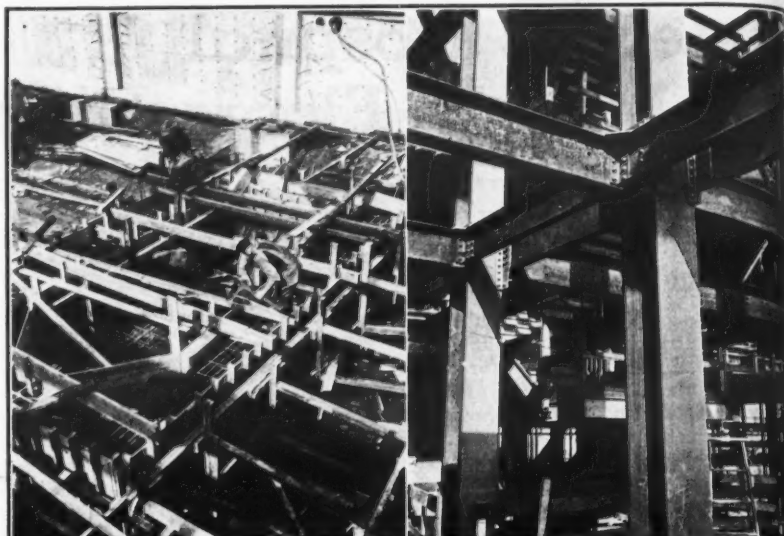
Pile Foundation

Work on the project got under way in April, 1947. The Stock Construction Co. of New York City excavated the site. This was followed with the driving of foundation piles by the Raymond Concrete Pile Co. of New York City, one of the many subcontractors taking part in

the construction of the hospital. A total of 3,900 uniform-taper shell piles, 10 to 25 feet long, were driven and then filled with concrete. A 14-inch-diameter pile at ground level was required for a 30-ton bearing. Actually the piles were tested to twice that capacity, or 60 tons, after they were driven into the tightly packed brown-gray sand.

The piles were driven in clusters, on an average of 3-foot centers, with as many as 38 piles to a cluster. They were then capped with reinforced-concrete slabs of varying dimensions, with thicknesses of from 1½ up to 5 feet. The single largest cap measures 21 feet x 17 feet 6 inches. Two erection bolts were embedded in each cap, and to these were fastened the billet plates for the structural columns. The Stock Construction Co. poured the pile caps, while the concrete foundation walls were constructed by The Euclid Corp. and I. B. Miller Co., both of New York City, under a subcontract for Cauldwell-Wingate.

(Continued on next page)



C. & E. M. Photos
At left is the form for the boiler foundation in the service building of the Veterans Hospital. At right is a close-up of the 12-inch channels used in the wind-bracing feature of the structure; they are tied to the columns with ¾-inch rivets.

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WRITE FOR LITERATURE ON
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Structural Steel

By September, 1947, the foundation was completed, and the Bethlehem Steel Co. started erecting the structural-steel framework which was completed in February, 1948. The 6,600 tons put into the building came from the Pottstown, Pa., mills and was shipped by rail to Jersey City, N. J. There it was transferred to lighters and towed across the bay to the 69th Street docks in Brooklyn, where it was loaded into trucks and hauled to the job site.

Two cranes with jib extensions on their 80-foot booms erected the steel up to and including the sixth floor. Above that, four derricks with 70-foot booms completed the framework. Four rows of columns run the length of both wings, dividing them into three bays in width. In the hospital wing the heaviest column member is a 14-inch WF 314-pound beam at the basement level. In the core or tower section containing the elevators some 14-inch WF 370-pound beams were used. A typical ground-floor framing consists of 16-inch WF 36 or 50-pound beams. Floor beams are at the columns only; no intermediate beams were used with the composite-floor system of the structure. Rivets are either $\frac{7}{8}$ or 1 inch.

For wind-bracing, two channels were erected, one on each side of a row of columns across the building; they were tied to the columns by special angles and gusset-plate sets with twelve $\frac{7}{8}$ -inch rivets. This system cuts down on the amount of steel by eliminating intermediate stiffeners and braces. On the lower floors the channels are usually 12 or 15-inch members. Later the wind-bracing is to be encased in concrete.

The building is 291 feet high to the top of the tower. The height of the first few floors above the ground is 13 feet, but this decreases gradually to an average height of 11 feet 2 inches for most of the upper stories. The elevation of the ground floor is 26.0, well above ground water which is found there at elevation 4.

Floor System

A Republic Fireproofing floor system over the entire building is one of the features of the structure. This consists of slag blocks laid out in squares, checkerboard fashion, with reinforced concrete surrounding them. Two hollow blocks, open at one end, were placed with their open ends together to form



a 16-inch square 6 inches deep. Filler strips, or ribs, 4 inches wide, were left between the blocks. Steel reinforcing (Continued on next page)



From left to right, the first photo of the Veterans Hospital shows forms for the floor arch pour still in place. The second and third show the floor system before a pour, with hollow slag blocks laid out in squares and steel reinforcing rods placed in the filler ribs. In the fourth photo you can see the 100-foot Chesebro-Whitman tower powered by a Carlson electric hoist, lifting materials to the roof with a Chicago boom.



C. & E. M. Photos

ROAD BUILDERS TAKE NOTE THERE'S GREATER PROFIT WITH MADSEN ROAD CONSTRUCTION EQUIPMENT

PRODUCTION SPEED ACCLAIMED BY MADSEN PLANT OWNERS

RECORD MAKING PRODUCTION by a Madsen Asphalt Plant is no longer news; every day they are making new records, and breaking them the next. What is the secret to their production speed? Again they ask, "Since most asphalt plants look alike, wherein does a Madsen Plant differ?"

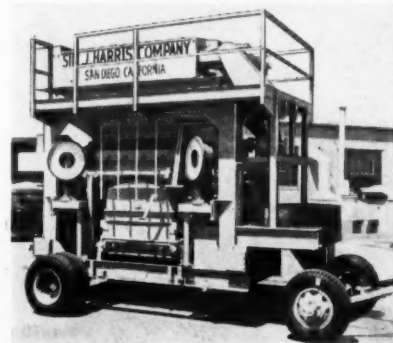
There is no single secret, Madsen plant owners agree, nor any single Madsen patented-feature which accounts for the phenomenal production records of Madsen Plants. Actually it can be all summed up in two words "Balanced Engineering."

Each Madsen patented-feature saves seconds in the mixing cycle. From the controlled speed of material handling through the double deck, oversize Symons Screen, the materials flow in exact proportion. Madsen-patented Pressure Injection saves seconds in entering the asphalt—saves seconds, also, in the mixing. And the oversize Pug Mill, through pressurized mixing, dumps a uniform batch in 30 to 40 seconds. This coordination and balance was not designed into Madsen Plants by chance. It is the direct result of almost 40 years' experience—years of painstaking effort—trial and error. That's why Madsen Plants are easy to erect, easy to maintain, eye-appealing and thoroughly satisfactory to contractors everywhere. That is why Madsen Plant owners are the top contractors—some with as many as 5 Madsen Plants.

Madsen Plants are located in various areas throughout the world ranging in size from 1000- to 6000-lb. batch capacity. They can be seen and studied; their addresses are available upon request.

A standing invitation is extended to all contractors who come to California to visit the factory to see for themselves the conception, imagination and thoroughness which marks Madsen engineering. Within an area of 10 miles there are 12 Madsen Plants to see—3 brand new '48 models. To guarantee the most from your visit, be sure to write for your copy of the Madsen Asphalt Plant Catalog.

Operating twelve months of the year this 4000-lb. Madsen Plant turns out as much as 1500 tons per day.



Portable Madsen 1000-lb. Plant on wheels ready for towing to operating site in San Diego, Calif.



Madsen Acquires Manufacturing & Distributing Rights to Johnson Float Finisher

The Johnson Float Finisher, widely known in western states, duplicates the action of the hand float. It has a troweling surface of more than 8000 square inches. It cuts off the high spots, fills in the voids and consolidates the mortar.

With mechanical efficiency the Johnson Float Finisher provides a finished surface of .05" variation or less in 10-ft. This is better than any state highway specification requirement. No wonder many state highway departments specify the Johnson Float Finisher virtually on an exclusive basis for finishing cement concrete highways.

SECURE PATENT RIGHTS

For the past nine years Madsen has manufactured the Johnson Finisher under licensed agreement and distributed it only in the eleven western states. Now, full rights to manufacture and distribute nationally have been acquired by Madsen Iron Works and plans are being made to increase dealer representation throughout the United States.

TERRITORIES OPEN TO DEALERS

Dealer inquiries are invited on the Johnson Float Finisher and other Madsen equipment. Colorfully illustrated catalogs and information are available upon request.

The complete line of Madsen road construction equipment in addition to Asphalt Plants and Finishers includes Batchers, Bins, Bunkers, Travel-Mix-Plants, the Eckstam Canal Pavers, Aggregate Dryers, Tunnel Conveyor Systems, Plate Feeders, Belt Feeders and Asphalt Plant Accessories.

Dealers and contractors should forward their inquiries to the following address:

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Veterans Hospital Built 17 Floors High

(Continued from preceding page)

rods were placed in these strips which were then filled with concrete to the top of the blocks. In alternate squares the two blocks making up a square were turned in opposite directions, so that the cracks at their open ends do not all point alike. This system provides lightweight yet strong and fireproof floors. Light flexible rods were partly embedded in the floor so that their ends drop down; to these the ceiling of the floor below is hung.

This whole floor system was laid out on wooden forms which included the floor beams in the arrangement. Wire beam clips were first strung along the steel floor beams, then a soffit or bottom form for the beam was hung in place, suspended by flexible-wire ties wrapped around the beam with a double turn. Into the bottom of this $\frac{3}{8}$ -inch soffit form, 2-inch spacers were driven to keep the form from being pulled up against the bottom-beam flange, since the steel is covered with 2 inches of concrete fireproofing.

Into the soffit on each side of the beam were then framed the haunches or side forms for the beams. They were also of $\frac{3}{8}$ -inch stock, and were reinforced with a 1 x 4 stiffener running lengthwise of the forms. The haunch came up on the beam as far as the bottom of the floor slabs. When it was in place, it was held there firmly by nailing a tightening strip into the soffit at the bottom of the haunch. Then the floor or deck form was built, usually in 2 x 10-foot panels, carried on the sides by the haunches and at the center by a row of uprights on the floor below.

These posts or uprights were normally 4 x 4's placed on 4-foot centers in a row midway between the floor beams. They were capped with 4 x 6's, and wedged at the bottom to bring them up to the required grade. Across them 2 x 6 stringers were laid on 12-inch centers to support the floor panels. Where a couple of 2 x 6's were needed for the length of the span, they were lapped at least 4 feet for the splice.

Forms for the floor slabs were kept in place longer than for other pours after they have been filled with concrete. The usual time for the floor slabs was 28 days. In order to remove the sections around the beams, another row of posts was set up on the floor below alongside the original row, but bearing against the panels. Then the stringers were taken down, also the haunch and soffit forms together with the first row of uprights.

Concrete Operations

Truck-mixed concrete was used on the project. Ryan Concrete Co. supplied concrete for the main-building pile caps to the Stock Construction Co. For the foundation wall and floors The Colonial Sand & Stone Co. delivered concrete from its batch plant at Gravesend Bay, Brooklyn—a 2-mile haul from the job. Three or four truck-mixers supplied the needs of the foundation-wall contractor, while five or six were used in pouring the floor system. Air-entrained cement was generally used in the mix, but during the winter operations high-early-strength cement was employed in the floor-slab construction. Sand and $\frac{3}{4}$ -inch gravel constituted the fine and coarse aggregate. For the floor system, 2,500-pound concrete was required, and for the foundation walls, 3,000-pound.

For the 12-inch foundation-wall pours the concrete was generally chuted from the truck-mixers directly into the universal-type forms of $\frac{3}{8}$ -inch plywood. During the winter, the ingredients of the mix were heated, and after the pour the forms were covered with tarpaulins. The fresh concrete was kept warm with Herman Nelson self-powered gasoline heaters which blew hot

air through 12-inch-diameter canvas tubes up to 40 feet long. These tubes were laid under the tarpaulins right down to the concrete in the forms.

In placing the concrete for the floor arch or slab pours, chutes were used only at ground level. Above that the concrete was handled by Chesebrough-Whitman towers powered by Carlson electric hoists. Two 100-foot towers, one at each end of the building, served the administration wing, but three others with a height of 285 feet went into service on the higher hospital wing.

When the tower hoists were used, the truck-mixers discharged their loads into a 3-yard receiving hopper at ground level. From there the concrete dropped into a 1-yard bucket down in a pit at the bottom of the elevator shaft.

This bucket was raised to a point slightly above the level of the floor being poured so that it could discharge into a 2-yard hopper set up on that floor. Under that hopper the concrete was picked up in 6-cubic-foot rubber-tired buggies which were wheeled over wooden runways laid out around the deck. From six to eight of these one-man buggies were in service at the time during a floor pour.

The average slump of the concrete was 4½ inches, and as it was placed the mix was vibrated with Jackson vibrators. On the floor pours the concrete was leveled off with shovels even with the top of the flag blocks. Later, 2 to 4 inches more of concrete will be added for a finished floor and given a smooth surface. This may later still be covered

with wood, linoleum, tile, etc., according to the design.

On the roofs is a similar construction, but the slag blocks are not so deep—only 4 inches. And the concrete, leveled off with screeds, is placed 1½ inches over their tops. It will be covered with a 1-inch insulation course and then the built-up roofing material.

Winter Protection

During the warm weather the concrete was kept wet down with water for curing, but in the winter elaborate precautions were taken to keep the concrete from freezing. The freshly poured concrete was covered with salt-marsh hay and then with tarpaulins. A temperature of 50 degrees F was maintained.

(Concluded on next page)

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tained all around the new floor by stretching tarpaulins not only around the outside of that floor and the floor below, but also to 4 or 5 feet above the floor under construction. Coke-fueled salamanders were kept burning for at least 72 hours on the floor beneath the fresh pour to hold that 50-degree temperature.

From 900 to 1,000 square yards of floor was poured in an 8-hour day, with a pour taking place every other day as a general rule. On the alternate days the forms were being prepared, the blocks laid, and the reinforcing rods set in place. To facilitate the handling of material from ground level up to where it was wanted on the floors, Chicago booms were rigged up at the top of the hoist towers. Blocks, forms, steel, etc.,

were raised quickly to the work level.

Much of the form work, such as panels, was prepared in the yard at the side of the hospital. A lean-to was set up which housed a table saw equipped with a 16-inch-diameter blade. In the steel section of the yard the reinforcing rods were cut to size and bent to shape with Lewthwaite cutters and benders.

By April of this year the floor work had progressed sufficiently so that the bricklayers were able to start laying the faced oyster-white brick for the 12-inch outer walls. The brick was supplied by the Entwisle Corp. of New York City, and was laid by the forces of the general contractor.

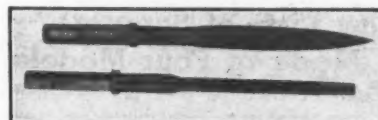
Personnel

From 200 to 300 men are employed on

the project, with this number increasing to about 500 during the bricklaying work. Cauldwell-Wingate Co., the general contractor, is represented by John Paterno, Superintendent.

For the Corps of Engineers, Department of the Army, the engineer in charge of the Veterans Hospital construction at Fort Hamilton is Maxwell H. Gray. The project is under the supervision of the New York District, which is headed by Col. Charles F. Williams, District Engineer. Joseph A. Rooney is Chief of Construction.

Over 230,000,000 children in the world are haunted by the spectre of hunger and disease. Help them by contributing generously to the United Nations Appeal for Children.



The wedge-shaped cross section of the new Sabur moil point pictured at the top is designed to increase its shattering action as it is driven deeper into concrete.

Moil Point Features A Wedge-Type Shape

A newly designed moil point for use in pavement breaking has been announced by the Rockbit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa. The Sabur point is built with a wedge type of cross-sectional area, and is said to increase its shattering action as it is driven deeper into the concrete. It is also designed to shear reinforcing mesh as it penetrates the concrete.

The Sabur moil point is made in two shank sizes—1½ x 6 inches, and 1¼ x 6 inches. It can be furnished in under-collar lengths of from 16 to 24 inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 104.

Bantam-Size Meter Indicates Bin Level

An indicator for use on small hoppers, spouts, chutes, conveyors, and similar applications has been developed by The Bin-Dicator Co., Dept. F-605, 14615 E. Jefferson Ave., Detroit 15, Mich. The Bin-Dicator is a diaphragm-operated switch for signaling changes in material levels. It can be mounted on the outside of bins, hoppers, and other storage equipment. The Bantam model has an overall diameter of 5¾ inches.

According to the manufacturer, these units can be used to start or to stop filling or emptying operations as soon as the level of the measured material reaches pre-set limits. They can also be used to stop machinery when feed chutes or elevator boots become clogged with material. Special models are available for hazardous locations, and for internal mounting inside thick-walled or multiple-compartment bins.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 108.

Repair of Roof Surfaces Is Subject of Brochure

Protection of roofs before deterioration starts is good insurance against costly repairs later on. United Laboratories, Inc., has developed a roofing-repair system for use in the maintenance of all types of roofs. And instructions on the process are contained in a special roofing brochure available by writing to the company at 16801 Euclid Ave., Cleveland 12, Ohio.

The brochure contains a 4-page folder on the how and why of each step, explaining also its relationship to the complete operation. Photographs and schematic drawings illustrate the method of application.

Individual instruction sheets describe in detail the process to follow on various types of roofs—metal; tar or asphalt and gravel; traffic deck over wood, concrete, or black-top; shingle; tile, and others. It also tells how to apply the system when these roofs are in various stages of deterioration.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 98.

Macwhyte Representative

W. Howard Minton is the new direct factory representative of the Macwhyte Co., manufacturer of wire rope. Mr. Minton will cover the gulf-coast area from his headquarters in Houston, Texas.

"NEW STANDARD" 125 FT. MODEL
runs 2 big breakers or 3 medium breakers at top pressure (40% more efficient) yet sells at old, "single breaker" 105 ft. price . . . All other sizes are comparable.

MODEL 75 runs heavy breaker, 2 light breakers or 3 tampers at 90 lbs. pressure, which no 60 ft. unit can do.

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MODEL 250 runs 4 heavy breakers, 2 heavy drills or medium wagon drill at 90 lbs., which no 210 ft. unit can do.

MODEL 365 runs heavy wagon drill plus rock drill or heavy breaker at 90 lbs., which no 315 ft. unit can do.

MODEL 600 runs 2 heavy wagon drills plus heavy rock drill at 90 lbs., which no 500 ft. unit can do.

"new standard" model
75 cfm
replaces old model 60

"new standard" model
125 cfm
replaces old model 105

"new standard" model
185 cfm
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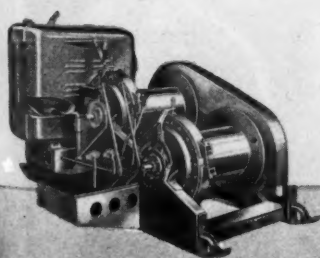
"new standard" model
365 cfm
replaces old model 315

"new standard" model
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Form Tampers
Concrete Mixers
Cold-Patch Mixers
Plaster-Mortar Mixers
Self-Raising Towers
Portable Hoppers
Truck Mixers

New Line of Scrapers Made in Four Models

Cable-controlled S-type 4-wheel scrapers are now available from the Bucyrus-Erie Co., South Milwaukee, Wis. Models included in the new series are: the S-46 with a 4-cubic-yard struck capacity, the S-68 with a 6-yard capacity, the S-91 with an 8-yard capacity, and the S-113 with a 10-yard capacity.

Among the features claimed for these scrapers are increased maneuverability, low center of gravity, widespread rear wheels, and low bowl height. The drop-center front axle is said to eliminate downward thrust on the front wheels, and the low fairlead hitch is designed to give proper line lead, especially on sharp turns.

Other improvements listed include: a hinged apron with adjustable opening for clean discharge of sticky materials; tilting bowl with curved section and high back for better loading; straight-line cable reeving; positive bowl return; and, as optional equipment, an adjustable push bumper with a long contact bar to eliminate jackknifing. The scrapers have the Bucyrus-Erie double-curve cutting edge and positive-rolling type of ejection.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 8.

Bulletin Describes Methods Of Shoulder Improvements

"Highway Shoulder Improvement Methods" is the title of a new 24-page pamphlet on design, maintenance, and other problems of this phase of road work. It has been made available by Seaman Motors, Inc., 306 N. 25th St., Milwaukee 3, Wis., and serves as a guide and ready reference in shoulder design and construction.

The text begins with a brief analysis of the highway shoulder problem. Next follows a step-by-step outline of procedures to follow in developing several types of traffic-resistant turf shoulders to serve safely and practicably occasional or emergency traffic. Types of border strips and pavement edging designed to carry a portion of the main traffic are also discussed. Throughout the book, text and photos illustrate the use of the Seaman Pulvi-Mixer in the construction of various types of shoulders. The Pulvi-Mixer is a rotary-type



One of the units in the new Bucyrus-Erie line of cable-controlled S-type scrapers is the 6-cubic-yard S-68. It is pictured here working with an International TD-14 crawler tractor, mounting a Bucyrus-Erie hydraulic bulldozer.

mixer for use in roadside-development and soil-stabilization operations.

One section of the booklet is devoted to a discussion of the materials to use,

according to regional needs and native materials available, and outlines the particular merits of each type.

Copies of this literature may be ob-

tained from the company. Or use the enclosed Request Card. Circle No. 88.

Electric-Tools Catalog

A miniature-size catalog describing its abrasive-belt machines and portable electric tools is being distributed by the Porter-Cable Machine Co., 1805 N. Salina St., Syracuse 8, N. Y. This 20-page catalog is printed in two colors, and is profusely illustrated.

Equipment featured in Bulletin No. 666 includes large abrasive machines with automatic feed table, centerless belt grinders, tool-room surfacers, bench-type abrasive-belt models, and backstand idlers. The electric-tool section lists saws, sanders, edgers, and radial saws for use in woodworking, building, and construction. Specifications and applications are stressed throughout the booklet.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 57.

VIBER INTERCHANGABILITY offers VERSATILITY in concrete placement



ELECTRIC MOTOR



PNEUMATIC MOTOR



GASOLINE MOTOR

The standardized line of VIBER Vibrators is a complete combination of interchangeable units readily adaptable to all types of concrete construction. Varying job requirements are easily met by a rapid change of vibrator heads or length of flexible drive, eliminating on-the-job delays and the necessity of purchasing excessive equipment. In the development of VIBER Vibrators every consideration has been given to employing the best method for concrete compaction while reducing construction time and concrete placing costs for the contractor.

The three illustrations to the right are typical combinations of VIBER'S interchangeable units.

Please write for VIBER's illustrated catalog



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6', 12' and 21' lengths

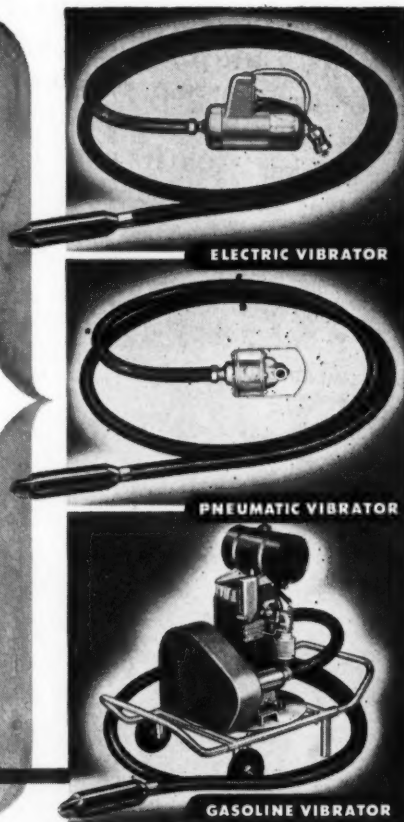


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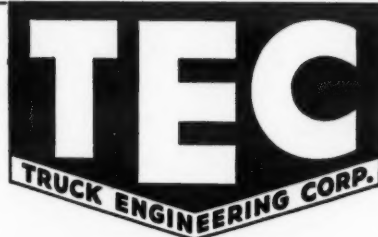
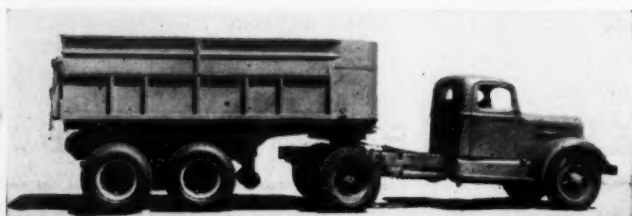
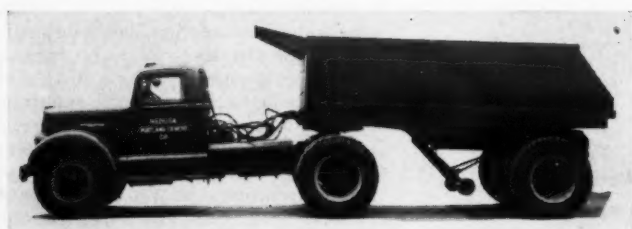
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All models available with either power type fifth wheel or with pump installed on tractor and hoses for operating hoist on trailer. Location of trailer axle and fifth wheel designed to provide proper load distribution for maximum legal load.

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The new Disston chain saw has an 18-inch cutting capacity and a 2-cycle Mercury gasoline engine which delivers 3½ hp at 4,000 rpm. The saw is one-man-operated and can be used in any position.

One-Man Chain Saw

A one-man-operated chain saw is announced by Henry Disston & Sons, Inc., 574 Tacony St., Philadelphia 35, Pa. It has a cutting capacity of 18 inches. Power is provided by a 3½-hp 2-cycle air-cooled Mercury gasoline engine running at 4,000 rpm. According to the manufacturer, this saw can be used in any cutting position, including upside down.

Other features claimed for the saw include full precision-bearing construction, a specially designed fuel system, a fuel meter to regulate flow of mixed fuel to the cylinder, and a crankshaft-type magneto protected against moisture and dirt. This saw has a built-in automatic chain lubricator with one moving part—the flexible pick-up tube inside the oil reservoir. The engine is started by a self-rewinding Magnapull starter. The throttle is located at the operator's finger tip, with the fuel-mixture control lever near by. Squeezing the handle disengages the clutch, and releasing a safety catch re-engages it.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 105.

Hammer Attachment

An attachment for converting electric drills to power hammers is made by the Dril-Hamer Co., 131 W. 83rd St., New York 24, N. Y. While applicable to a wide variety of light-duty jobs, the Dril-Hamer's widest application is as a drill for masonry anchors. It can be chucked in any ¼-inch electric drill, according to the manufacturer. The hammer is spring-activated, the drill unit serving to wind and cock this spring. Thus the actual hammering operation is independent of the power of the drill.

The Dril-Hamer has two toolholders which also fit Rawldrill taper shanks as standard equipment. These will fit drill bits Nos. 6 to 14, and from 5/16 to 5/8 inch. The Dril-Hamer attachment is 6½ inches long, 1½ inches in diameter, and weighs 2 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 69.

Construction Equipment

A 12-page bulletin on its complete line of construction equipment can be obtained from the Le Roi Co., 1706 S. 68th St., Milwaukee 14, Wis. Bulletin CG-5 has been prepared expressly for the construction industry, and features a description of the Le Roi post-war Airmaster compressor.

Among the items covered in the catalog are paving breakers, rock drills, diggers, tampers, wagon drills, gasoline power units, package generators, highway mowers, and the Tractair 35-hp tractor-compressor combination unit.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 63.

Ball-Bearing Co. Exporter

An export agent for its line of ball and roller bearings, tie rods, draglinks, and other products has been selected by the Hoover Ball & Bearing Co., Ann Arbor, Mich. All territories outside of the United States and Canada will now be

handled by the Borg-Warner International Corp., 310 S. Michigan Ave., Chicago, Ill.

Laws on Weight and Size Of Trucks and Trailers

A free pocket-size booklet which contains the road laws regulating trucks and trailers throughout the United States has been compiled by the Research Department of the Four Wheel Drive Auto Co., Clintonville, Wis. This 1948 edition of "Truck & Trailer Size & Weight Restrictions" is now ready for distribution.

The laws which regulate the size and weight of trucks and trailers are enacted by the legislature of each state for operation within its boundaries. Therefore, it is important that operators and owners know the laws of all states through which their vehicles will pass while en route.

The new booklet contains full information on these regulations, and explains graphically the differences be-

tween the motor-vehicle laws of the several states. The data on each state are summarized above the signature of the State Highway Commissioner or

other duly authorized official.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 4.

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The accepted air entraining agent for concrete
Already used in over 50,000,000 yards of concrete on
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GOOD ROADS MACHINERY CORP., MINERVA, OHIO

Hot-Mix Crews Push Big Paving Project

Six-Lane Divided Highway Gets Asphaltic-Concrete Surfacing to Complete Important New Section

MOVING rapidly, paving crews of the Southwest Paving Co. of Roscoe, Calif., have given a new look to the relocated part of U. S. 99 north of Castiac. It was there, last year, that Clyde W. Wood, Inc., of North Hollywood graded a 2.4-mile section to new standards of modernity. (See C. & E. M., Nov., 1947, pg. 45.) Southwest Paving Co. has now covered the new six-lane mountain highway with asphaltic-concrete pavement, placed in two courses on select flexible sub-base.

Started February 8, the paving was finished May 1. The project itself began early last year, when earth-moving equipment of Clyde W. Wood started the grading.

U. S. 99, now the most heavily traveled truck highway in the west, has been marked by a program of continual betterment from Canada to Mexico. Traffic has increased so fast that improvement work has seldom kept pace with increasing vehicular demand. However, this job may be one of the first to step ahead of demand.

Each roadway of the new highway is 33 feet wide, separated by a 6-foot central dividing strip. Shoulders each are 9 feet wide. The hot-mix asphaltic-concrete pavement is 4 inches thick, compacted. It rests on a special sub-base composed of three layers of selected material. Underneath the pavement is 0.5 foot of untreated crushed-rock base. Underneath that material is a layer of imported borrow, from 0.33 to 1.17 foot thick, with an average thickness of 0.67 foot. Under that layer, and resting on the compacted embankment, is a 0.5-foot layer of compacted sand.

Wood Places Sub-Base

Clyde W. Wood's equipment and men produced and laid the sub-base. Southwest Paving Co.'s subcontract was limited to 30,000 tons of asphaltic concrete.

Pervious sand for the first sub-base course was produced in a riverbed about 5 miles from the job. A simple scalping

screen, which rejected the 2-inch over-size rock, was set up, and the pervious material was hauled out to the job. A Manitowoc 3000-B dragline fed the scalper, and enough hauling equipment was assigned from Wood's fleet to carry the material away to the job. This hauling equipment, for the entire sub-base job, consisted of three 5-yard International trucks, two 12-yard Wood bottom-dump wagons, three 8-yard Autocars, and an 8-yard White truck.

The sand was dumped in approximate 6-inch lifts or less, spread by a Caterpillar No. 12 motor grader, watered, and rolled. A 6-inch pipe line, supplied by two Gorman-Rupp pumps, fed water through flexible hose to all parts of the job. When this pipe line was dismantled 75 per cent through the project, the



C. & E. M. Photo

On abutting lanes of U. S. 99, the Barber-Greene machines lapped over a few inches in order to make a smooth joint.

rest of the sprinkling water was hauled in tank trucks.

Select imported borrow for the next course came from the best parts of the excavation, and consisted of decomposed granite, conglomerate, and sandy material.

Clyde Wood also quarried and produced the crushed-stone blanket directly under the asphaltic pavement. The production site, located at the south end of the job in the mouth of a blind canyon, met every requirement of the

(Concluded on next page)

VISIT ERIE'S DISPLAY AT THE ROAD SHOW...

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SOUTH CONCOURSE

See the New Addition to the STRAYER PORTABLE CONCRETE PLANT

THE CONCRETE HOIST!

It speeds concrete production by removing one entire batch, allowing next to start at once. It raises one complete batch to the limit of the auxiliary boom (see illustration). It chutes concrete within 90° radius to truck-mixer, "dump-crete" truck or direct to forms while other batch is mixing. It delivers shrunk concrete to increase truck-mixer payload. It permits making concrete at or near the job, reducing trucking costs to a minimum.

For example, the 3/4 yard Strayer Portable Concrete Plant at the left is located about 1000 yards from the job site. Two 4-yard agitator truck-mixers, charged at the Strayer Plant, were kept moving from plant to pouring site.

Make a note today to see this plant in operation at Chicago. You'll see how it will give you an edge on many kinds of concrete work. Write for details.



SEE TWO OF ERIE'S NEWEST CONTRACTOR'S BUCKETS
SEE ERIE'S NEWEST AGGREGATE METER!

ERIE

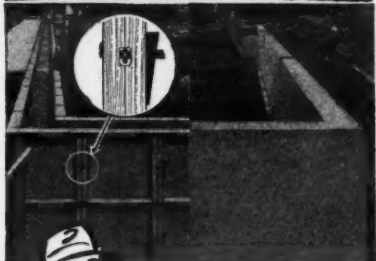
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specifications. The formation was drilled by two Cleveland wagon drills, jarred loose by explosives, and loaded to two trucks by a 1½-cubic-yard Lorain shovel.

These trucks hauled only about 500 feet and discharged the broken stone to a 6 x 9-foot receiver, covered with seven grizzly rails 18 inches apart. From there it passed through a Universal jaw crusher, a portable set of Universal roll crushers, to a portable screening plant, where it was classified for size. The rock then passed by conveyor to a 40-ton surge bin, where trucks hauled it out to the road. The hauling equipment mentioned previously was used on this work.

This same quarry and plant also produced the fine aggregate for the hot-mix asphaltic concrete.

Compaction* of the flexible base included the use of sheepfoot, pneumatic-tire, and steel-wheel rollers. Under the terms of the subcontract with Southwest Paving Co., Clyde Wood shaped this sub-base to the final lines, ready for the hot-mix, just ahead of the paving crews.

Asphalt-Plant Set-Up

A Madsen asphalt plant, consisting of a single Madsen No. 178 drier, a Madsen pugmill, hot and cold elevators, steam boiler, and smaller auxiliary equipment, mixed and batched the asphaltic concrete. This plant was set up within a few hundred feet of the Clyde Wood aggregate-crushing machinery at the mouth of the canyon, near the south end of the job, where the native aggregate was found.

Aggregates from the crusher were stockpiled over a 7-foot-diameter tunnel 60 feet long. All sizes of aggregate were stocked in the one pile, so that one feeder trap door through the roof of the tunnel supplied the asphalt plant with rock. The aggregate was dumped from trucks, and pushed up over the tunnel trap door by a Caterpillar D6 tractor, on which a Caterpillar bulldozer blade was mounted.

Asphaltic cement was furnished by Union Oil Co. from its Wilmington refineries. Asphaltic cement for the base course was 85-100 penetration; 120-150 penetration was used in the surface course. The asphalt came out to the job as needed, and was hauled by the Mercey Transportation Co. of Los Angeles. From 21 to 23 tons of the material came out per load.

It arrived on the job still above pumping temperature, and a Roper 2-inch centrifugal pump driven by a Sterling electric motor unloaded the material from transport trucks. This same pump, incidentally, also fed the asphalt plant.

A 10,000-gallon storage tank for each type of asphaltic cement, each tank heated by steam coils, was a part of the asphalt-plant set-up. A 10,000-gallon fuel tank was also provided, with a centrifugal pump for circulating fuel.

Perhaps a bit unusual was the system Southwest Paving Co. used to un-freeze asphalt lines after a shutdown. Both asphalt tanks and the pump were so rigged that live steam from the boiler passed back through the pump, through the asphalt lines, and into the tanks. Any asphaltic cement which would not drain back to the tanks, after a day's



C. & E. M. Photos
At the aggregate-production site for this U. S. 99 job north of Castaic, California, a Lorain 1½-yard shovel (above) loads rock to an 8-yard White truck. From that point the material is hauled to the crusher and dumped to the 6 x 9-foot receiving hopper (right). The conveyor at right takes the material from the crusher to storage bins, where it can be dumped into truck beds for transfer to the job site.



run, could thus be cleared up readily.

Steam-boiler equipment at the plant consisted of an 85-hp horizontal locomotive-type boiler, designed to furnish steam at 150 psi. Newhall Refining Co. furnished and delivered the 14 gravity

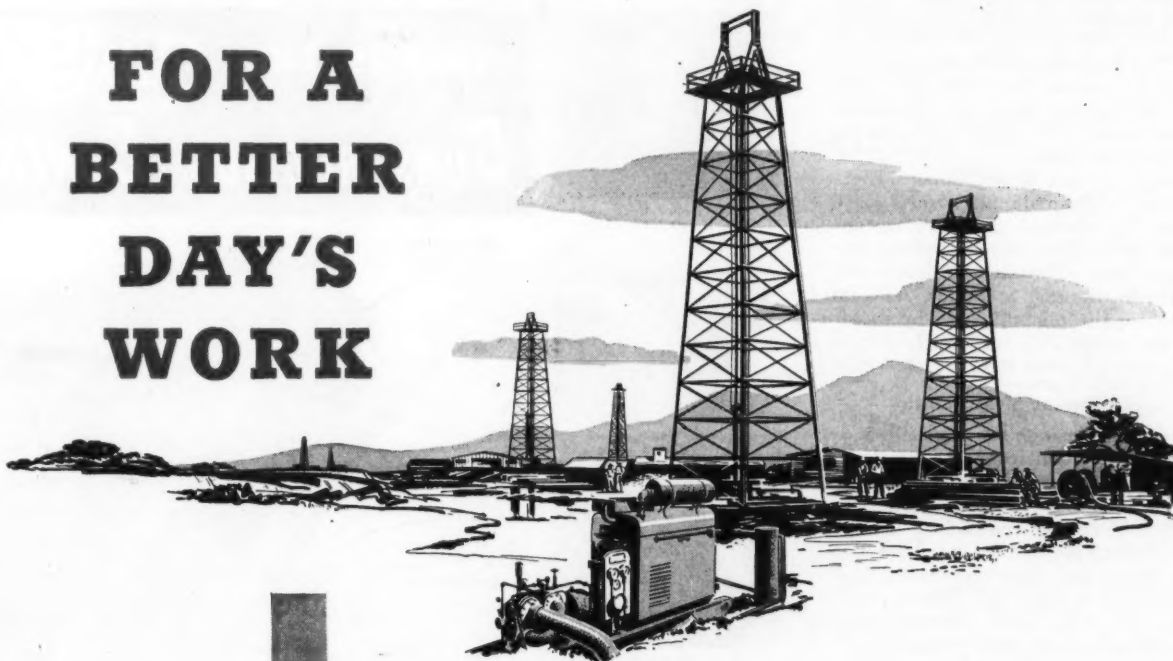
heavy-type fuel oil used by this boiler. The boiler furnished steam to the drier burners, the steam coils in the asphalt tanks, the pugmill gate rams, asphalt pumps, water pump, the force-feed blower, and fuel-oil tank coils.

Boiler water came to a 4,000-gallon tank through 2-inch piping, laid downhill from a small spring in the canyon.

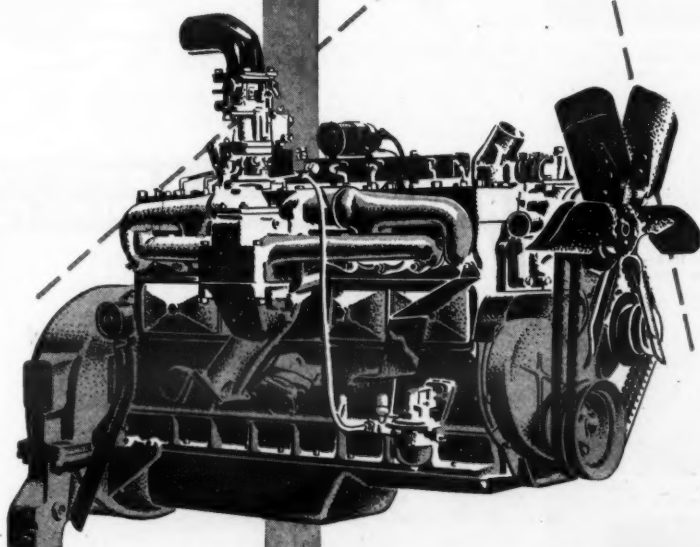
Auxiliary equipment, too, was needed. Since many of the plant motors

(Continued on next page)

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● Today, as never before in our history, oil production is of key importance to the nation. Powered equipment which pumps "black gold" out of the earth must give peak performance in the vital job that lies ahead. That's why Chrysler Industrial Engines are specified in so many makes of powered equipment—why they're called on for the toughest tasks around drilling rigs. Their horsepower has a pedigree of unfailing performance, backed by Chrysler's engineering and production skill. Yes, wherever gasoline engines are depended upon for flexible, economical power, users are finding that Chrysler Industrial Engines are Built For A Better Day's Work!

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INDUSTRIAL ENGINE DIVISION, CHRYSLER CORP., 12200 E. JEFFERSON, DETROIT 31, MICHIGAN





C. & E. M. Photo

Here is Southwest's Madsen asphalt-plant layout at left, with a Caterpillar-mounted bulldozer stockpiling aggregate. The crushing equipment and aggregate-deposit excavation are in the right background.

Hot-Mix Crews Push Large Paving Project

(Continued from preceding page)

were electrically powered, a separate source of electricity was needed. A General Motors 540-hp Model 8-268A diesel engine, driving an Electric Machinery Co. 300-kv generator, filled that bill. This big engine and generator was set up in a shed about 300 feet away from the asphalt plant, and generally upwind where dust would not harm the generator armature.

Electric motors, mostly General Electric and Westinghouse, were used around the plant. A 30-hp motor operated the shaker screens above the storage bins. The dust-collector fan was driven by a 50-hp motor. A 75-hp motor ran the pugmill, a 50-hp motor ran the single Madsen drier, and a 20-hp unit actuated the rock elevators.

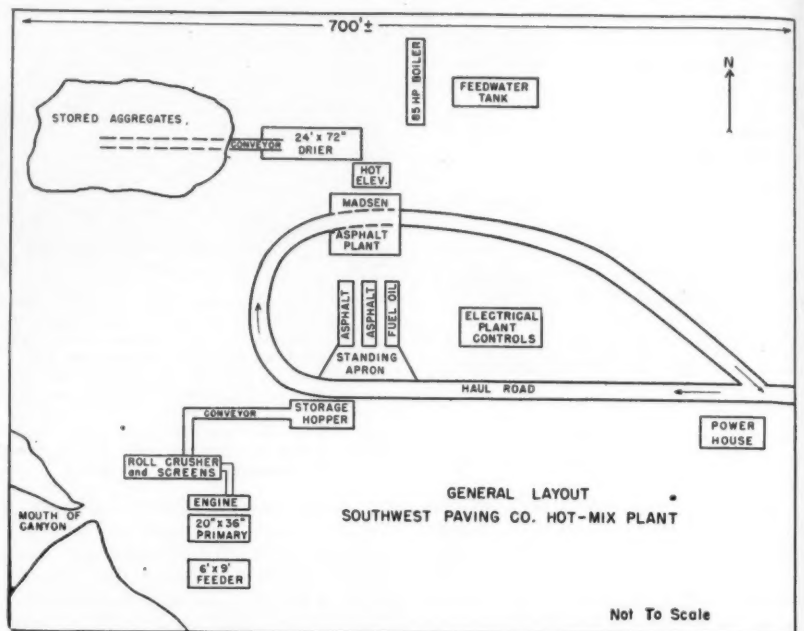
Movement of Material

In passing through the plant, the material dropped from the stockpile through a door in the tunnel roof. A 20-inch rubber-belt conveyor, electrically driven, carried the rock to the 24-foot x 72-inch Madsen drier and dumped it in. There the rock was heated to a temperature of about 300 degrees. Extreme care was used. Temperatures which were too hot could break the aggregate down and ruin it for hot-mix.

Hot aggregate from the drier, with all moisture removed, then moved up a 45-foot hot elevator to a 4-deck screen, where the rock was classified for size. Each deck of screens was 60 x 48 inches

in size. In order to screen the material to meet the specifications for top-course material, four sizes were used: 1/4-inch, 5/8-inch, 1-inch, and No. 6. The latter size passed the sand fines in the mix.

(Continued on next page)



High Tipper Rock and Ore Hoists and Bodies



Garbage and Rubbish Bodies



"Super" Hydraulic Hoists and Bodies for all trucks



Heavy Duty "Super" Hoists. Bodies up to 30-ton capacity



Special Hydraulic Platform Body Hoists

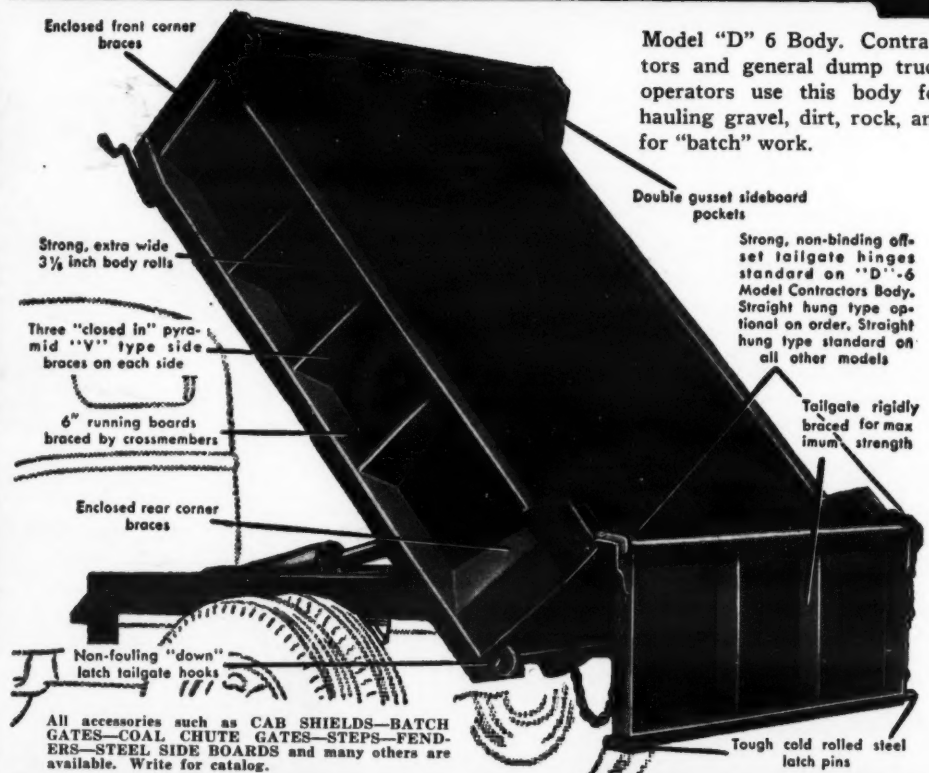


Special Low Mounted Garbage Body

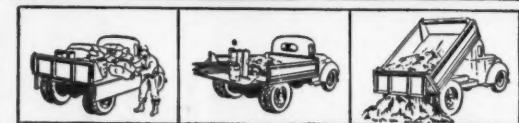


Anthony "Lift Gate" Loads—Unloads trucks

THIS IS THE ANTHONY DUMP BODY CONSTRUCTION CONTRACTORS PREFER



THIS SPECIAL BODY FOR STREET AND HIGHWAY DEPTS. IS IDEAL FOR MANY OTHER JOBS MODEL D-18



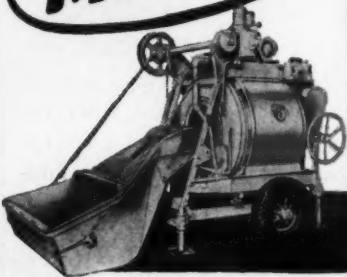
This Body is the most versatile on the market for the general dump truck work of street and highway departments. The hinged sides, when lowered, hang straight down for easy loading or unloading, and give extreme LOW LOADING HEIGHT. The tailgate, when lowered, makes an ideal body for hauling long branches, timbers and forms.

Available in 78" and 84" inside width only, and 7 ft. to 10 ft. lengths, in any capacity up to 3 cubic yards. Ends extend 7" higher than sides. 10 gauge steel throughout.

Notice in photograph extreme LOW LOADING HEIGHT for hand shoveling. Three-fourths of load can be loaded at PLATFORM HEIGHT.

ANTHONY
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Fast Modern Top Performing MIXERS



ONE, TWO AND THREE BAG SIZES.

Fast, compact, efficient—Built with Timken bearings. Machined drum tracks—Silent transmission and other plus value features. See the CMC Distributor today—or write for catalog.

CONSTRUCTION MACHINERY CO.'S.
WATERLOO, IOWA

ANTHONY CO., STREATOR, ILL.

After passing through the classifying screens, the rock aggregate dropped down to four storage bins. The material was then dropped out to weigh hoppers, correctly batched, and sent to the pugmill to be mixed with the hot asphaltic cement.

Asphaltic cement moved in a continuous loop between the storage tanks and the hot pot, pushed through piping by the asphalt pump. The valve at the hot pot permitted this unit to remain full, and the asphalt overflowed back to the storage tank whenever no asphalt was drawn off.

A novel and efficient arrangement was used for distributing asphaltic cement evenly and rapidly in the pugmill. A 4-inch-diameter pipe, with 1 1/4-inch slotted openings extending all the way across the pipe, extended across the top of the pugmill. Hot asphalt fed through this pipe sprayed evenly and rapidly across the whole batch, and was one of the reasons why this plant operated at capacity at all times.

Using the same arrangement, this same plant batched 2,400 tons of material in 11 hours at the El Toro Marine Base during the war, and set something of a record by producing 300,000 tons of hot-mixed material in 13 months.

The Batch

Rock aggregates, in order to meet the specifications, had to be within the following size limits:

Size Sieve	Per Cent Passing
1-inch	100
3/4-inch	95-100
No. 4	50-80
No. 8	37-68
No. 30	20-45
No. 200	3-12

The size and weight of aggregate was constant generally as between base and surface courses, though the percentage of fines in the surface course varied close to the upper limits of tolerance to get a mixture slightly finer. The batch weights, with the different asphalt weights, were as follows:

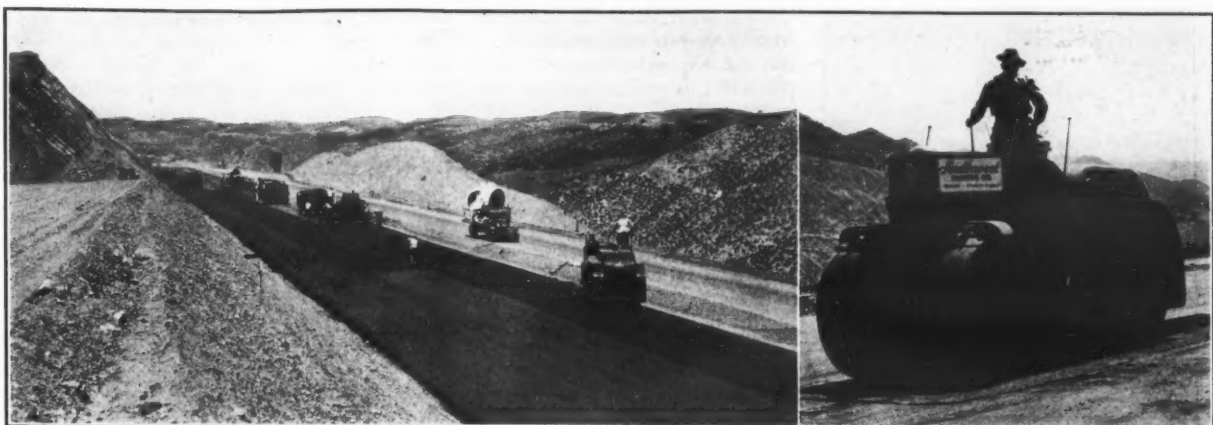
No. 4 rock (3/4 to 1-inch)	450 lbs.
No. 3 rock (No. 4 to 3/4-inch)	900 lbs.
No. 2 rock (No. 30 to No. 4)	450 lbs.
No. 1 rock (Pass No. 4 to 200)	1,200 lbs.
Asphaltic cement, 85-100 pen. (base)	5.5 per cent
Asphaltic cement, 120-150 pen. (surfacing)	5.7 per cent

The aggregates were weighed on beam scales, while the liquid asphalt was weighed on dial scales. The materials received a 30-second mix in the pugmill, and the batches were then discharged to waiting batch trucks. Five batches were hauled per truckload.

Batch trucks were weighed on a set of Howe platform scales before leaving the yard, and a state inspector stationed there gave a ticket to each truck driver. Ordinarily the drivers oiled the truck bodies after every third load with diesel fuel, as required. Trucks used were International KB-7's and Fords.

Laying the Pavement

After the trucks left the batch plant, they hauled their loads an average distance of 2 miles one way before they arrived on the job. Seven trucks were



C. & E. M. Photos

usually sufficient to keep the job moving along at top speed.

Two Barber-Greene Tamping-Leveling Finishers took the hot-mix directly from the truck beds, distributed it evenly over the width of a strip, and tamped it to about 80 per cent of its ultimate compaction, in one operation.

A general view of Southwest Paving Co.'s operations on U. S. 99 (left) shows a raker working on joints, two Barber-Greene Tamping-Leveling Finishers, and a Buffalo-Springfield roller. At right is a close-up of the new roller.

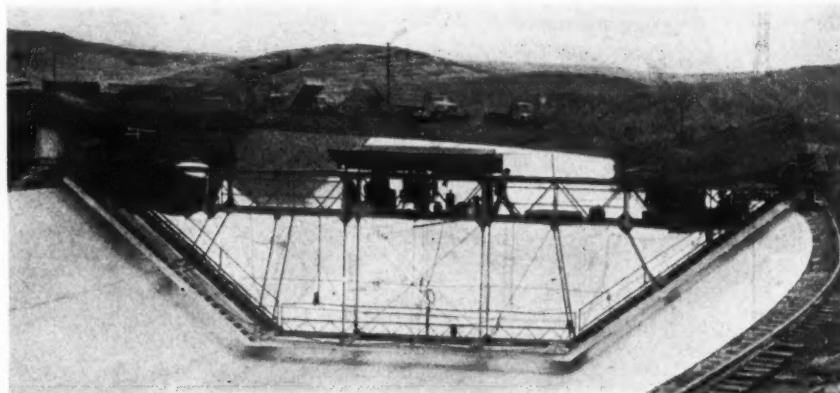
With traffic using the highway each day, it was no easy task to arrange the order of paving work. Charles Stewart, Job Superintendent, tried to keep his base-course material laid about 2,000

feet ahead of surfacing, because a time limitation in the specifications required 24 hours to elapse between the laying of these two courses.

(Concluded on next page)

HUNT PROCESS PIGMENTED WHITE - GRAY CONCRETE CURING COMPOUND

PROVIDING CURING AND TEMPERATURE CONTROL IN ONE OPERATION



HUNT PROCESS

White Pigmented
Concrete Curing
Compound used on
this large irrigation
Canal job.

"Hunt Process White Pigmented" is the standard "Hunt Process Clear" to which has been added sufficient white pigment to provide proper color and hiding power. It will meet U. S. Bureau of Reclamation Specifications.

"Hunt Process Gray Pigmented" is almost identical composition of "Hunt Process White Pigmented" except for the addition of another pigment which imparts a gray color to the film after application to the concrete. Developed for highway construction, it provides economical curing with temperature control without the glare of a white surface.

We also manufacture "HUNT PROCESS BLACK," a black asphaltic cut-back and "HUNT PROCESS CLEAR," a transparent membrane.

Write today for name of nearest distributor and complete information.



"Spray it and forget it"

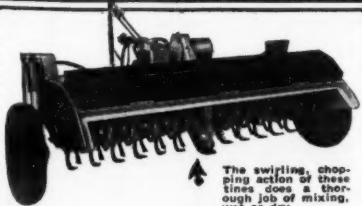
HUNT PROCESS COMPANY

Concrete Curing

Protective Coatings

Factory and Main Office: 7012 Stanford Avenue, Los Angeles 1, California

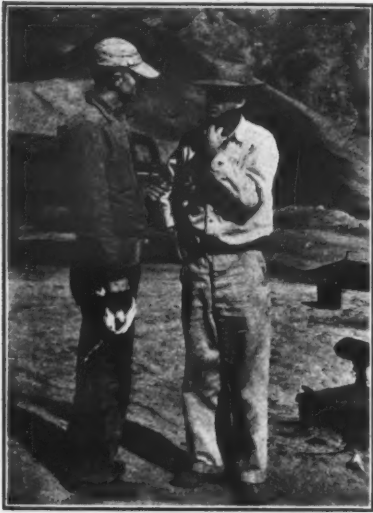
FOR SECONDARY ROAD CONSTRUCTION... ARIENS AGGMIXER



The swiftness, chopping action of these times does a thorough job of mixing, wet or dry.

HERE'S equipment designed especially for mixed-in-place construction—to operate in connection with other general purpose equipment. Whatever aggregates are used it thoroughly pulverizes, mixes and aerates aggregates with binder—rapidly and economically. Also ideal for soil cement stabilization. Safe made 4 standard sizes, 4', 6', 8' and 10'. Write for details.

ARIENS COMPANY BRILLIANT WISCONSIN



C. & E. M. Photo

Plant Superintendent J. E. Garcia, left, talks over details of the U. S. 99 paving job with General Superintendent Charles G. Stewart.

Hot-Mix Crews Push Large Paving Project

(Continued from preceding page)

The two sections of roadway were formed on each side of the dividing island by laying two 12-foot strips, full width of the Barber-Greene machines, and then blocking off 3 feet of the hopper to form a 9-foot strip. The material for the base course was laid about 2 3/4 inches thick behind the finishers, allowing about 1/4 inch more for roller compaction. The surface course was laid 1 1/2 inches thick to compact to 1 1/2 inches.

The first strip in a section of roadway was laid true to a string line, and the other lanes then followed the preceding edge. In making this longitudinal joint, the finisher operator continually crowded his machine slightly into the joint, thus forming a tight bond at the start. Ordinarily the machine lapped over a few inches to make this joint.

Screeds on the Barber-Greene machines were kept adjusted by a screed man, who also checked the depth of pavement continuously. A crew of 7 men and a foreman managed to keep both machines busy, while only 4 men were used at the asphalt plant to mix the material.

Longitudinal joints received the weight of a big 10-ton Buffalo-Spring-

field tandem roller immediately behind the Barber-Greene machines. The rest of the asphaltic-concrete strips were then left to cool somewhat, before they were rolled.

O. H. Hemphill, veteran roller operator who handled the Buffalo-Springfield machine, reported some interesting facts about the characteristics of this material. Except for some pavement in Alaska which he was on, he said that the material on this project had to cool out more than any he had ever seen, before it would stand rolling.

If he tried to roll it too soon, the surface of the asphaltic concrete cracked and checked. If it was allowed to cool until the sheen, or "color" left, it rolled down beautifully. So exact was the time of rolling this material that occasionally, where the long evening shadows came down the mountainside while another part of the strip was still in the sun, these sections cooled more rapidly. And it was occasionally necessary to break up the rolling on a strip to take that factor into account.

No transverse or diagonal rolling was done. The strips all received longitudinal rolling. The joints at the end of a day's work were beveled off to a feather edge, and then cut back square the next day.

No sealing had been done when this job was visited, but plans had been made to seal the surface of the hot-mix with about 0.1 gallon of emulsified asphalt per square yard. It was also planned to seal the shoulders and use a course of light sand blot at these places.

Personnel

The Castiac project was designed and administered by S. V. Cortelyou, Assistant State Highway Engineer at Los Angeles, Paul O. Harding, District Engineer of Operations, and Frank B. Cressy, Assistant District Engineer for Construction. Ray Cooley was Resident Engineer for the project.

For the contractors, Stanley Wood, son of Clyde W. Wood, was in charge of the job as General Superintendent. C. G. Stewart, General Superintendent

of Paving, directed the work done by Southwest Paving Co. J. E. Garcia was Plant Superintendent, and George Short was the Paving Foreman.

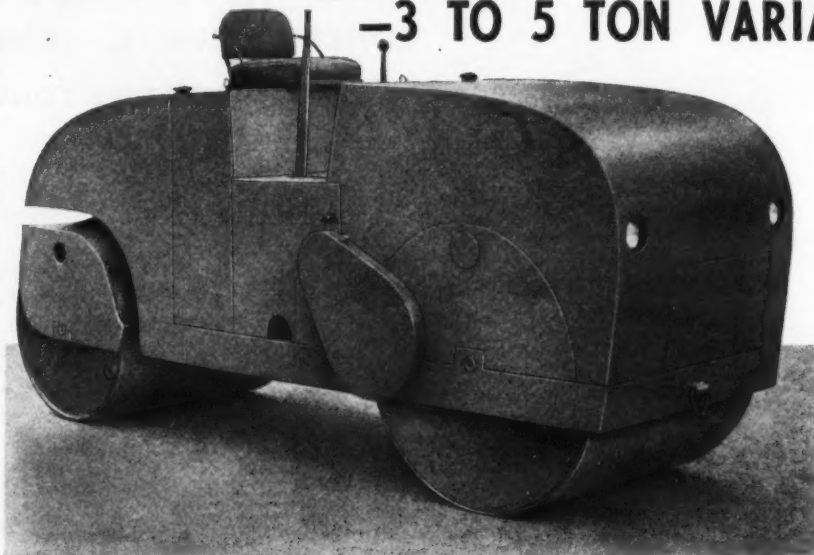
Slope-Indicating Gage

Instructions for the use and care of the Slope-Meter have been prepared in leaflet form by Wm. H. Ziegler Co., Inc., 2929 University Ave., S. E., Minneapolis 14, Minn. The Slope-Meter is a precision instrument for measuring all types of slopes or grades. It can be used with all sizes of tractors, bulldozers, scrapers, and graders.

The leaflet tells how to use the meter to obtain any given slope, to determine the slope the machine is grading, to determine the degree of slope between surveyors' stakes, etc. It also contains complete instructions on how to install the meter and how to adapt it to the various uses to which it can be applied.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 95.

THE NEW *Sealcoat* TANDEM ROLLER —3 TO 5 TON VARIABLE WEIGHT



Right side view of the new SEALCOAT TANDEM ROLLER showing full visibility position of driver's seat and the conveniently located right-hand clutch lever and left-hand ball top hydraulic steering lever—all of which permits of fast, easy and money-saving operation.

With SINGLE-LEVER
HYDRAULIC STEERING
CONVENIENT ELECTRIC
STARTER
and OTHER TOP MECHANICAL
FEATURES



The new SEALCOAT TANDEM ROLLER is a sturdily built all-purpose compacting machine. It handles almost all gravel or other rough surface jobs with a remarkable ease and speed that will save you money. It is designed to work in corners, confined spaces and maneuvers in small areas with its short 91" wheel base.

One of the outstanding features of the new SEALCOAT TANDEM ROLLER is its ability to work close to buildings—within 2 inches—as there is only 1 1/2" of frame extension on the left side, and but 3 1/2" on the right side. With its 13 3/4" ground clearance, it is possible to get a hair-line finish when working along curbs or other raised side obstructions. All this means the elimination of expensive hand finishing. The seat location allows the operator to see the work in all directions and with the new SINGLE-LEVER HYDRAULIC STEERING you can complete a compacting job in a minimum amount of time.

Other outstanding features of the new SEALCOAT TANDEM ROLLER include Electric Starter, Twin Disc Clutch and Foot Operated Parking Brake (which is engaged or released by the tipping action of the driver's foot). The geared bull wheel provides immediate and positive transmission of power with quicker starts and stops. There is no chain to break.

The single-lever clutch of this new compacting roller moves it forward and backward and allows immediate and precise control. There is free access to all working parts. With its low center of gravity, it is very safe for working on other than flat surfaces. It can be turned about in a 12 foot circle. It can be transported easily from job to job, or it will roll along under its own power at four miles an hour.

DEALERS: Here is a top quality roller that offers an excellent sales opportunity. It is low in initial cost, operation and upkeep.

WRITE US ABOUT TERRITORIES STILL AVAILABLE.

SEE OUR EXHIBIT—BOOTH 3017—45th Annual Convention and Road Show—Soldier Field, Chicago—July 16th to 24th.



This left-hand view shows the flush side with only 1 1/2" frame extension to make it simple to work within 2 inches of a building. Note the 13 3/4" ground clearance which permits of hair-line curb finishing.

SPECIFICATIONS

POWER: Allis-Chalmers Industrial Model B. 24.5 Brake Horsepower @ 1500 RPM; 27.8 Brake Horsepower @ 1800 RPM. Speeds: 2 forward and 2 reverse give 1.55 to 4 MPH range in either direction.

DIMENSIONS: Wheel Base 91". Length overall—132". Width overall—43". Tank height—57". Ground clearance—13 3/4". Left side clearance—1 1/2". Right side clearance—3 1/2".

COMPACTION ROLLER: Width—38". Diameter—40". Rolled and machined from 7/8" stock.

STEERING ROLLER: Width—38". Diameter—30". Rolled and machined from 3/4" stock.

COMPRESSION: Per lineal inch: Compaction Roller—155 lbs. with ballast. Steering roller—75 lbs. with ballast.

SPRINKLER SYSTEM: Gravity type. Tank capacity—100 gallons.

WEIGHTS: Shipping weight (approximately) 6500 lbs. Maximum weight (with ballast) 10,000 lbs. Extra metal weight—400 lbs.

TIMKEN BEARING EQUIPPED THROUGHOUT

WRITE FOR NEW BULLETIN—NOW READY

SEALCOAT ROLLER DIVISION

SHAW SALES & SERVICE CO.

5100 Anaheim-Telegraph Road - ANGelus 1-7141 - Los Angeles 22, California



Hose
BOOTS or CLOTHING

Call YOUR
Continental
BRANCH

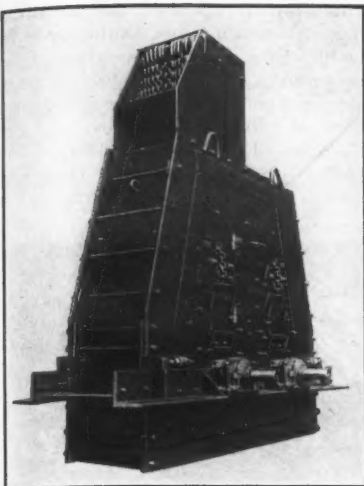
Immediate Delivery from Local Stock

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Cleveland, Ohio	Philadelphia, Pa.
Dayton, Ohio	Pittsburgh, Pa.
Detroit, Mich.	Richmond, Ind.
Hartford, Conn.	Rochester, N. Y.
Indianapolis, Ind.	St. Louis, Mo.
Kansas City, Mo.	San Francisco, Calif.
Lancaster, S. C.	Syracuse, N. Y.

CONTINENTAL
RUBBER WORKS

CRIC-PENNSYLVANIA-U.S.A.



This New Holland Model 2020 double-impeller breaker is designed for permanent installation in quarries and aggregate plants. It applies impact in suspension to reduce any stone passing through a 20-inch opening. Weight of the 2020 is 20,000 pounds.

New Crusher Unit Has Double Impeller

A new model double-impeller breaker is announced by the New Holland Mfg. Co., Mountville, Pa., a division of the New Holland Machine Co. Feature of these breakers is that they apply impact to the stone while it is in suspension. According to the manufacturer, the Model 2020 breaker can be used with any stone passing a 20-inch opening, not exceeding 20 x 20 x 36 inches.

Weight of the Model 2020 is 20,000 pounds. The two impellers weigh 2,930 pounds each, and are said to be carefully balanced. Each is equipped with three manganese-steel bars weighing 265 pounds each. The alloy-steel shafts have a diameter of 4 1/16 inches at the impeller core and 3 7/16 inches at the bearings. The Model 2020 is designed to produce cubical crushed aggregate, and its capacity is listed at from 50 to 135 tons per hour when operating on from 50 to 100 hp.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 9.

Power Thread Cutter

A power drive for operating pipe cutters, threaders, and reamers is announced by The Ridgid Tool Co., Elyria, Ohio. Named the Ridgid Porta-Power drive, it weighs 100 pounds and can be mounted on a stand or bolted to a bench. It will handle pipe from 1/8 to 2 inches in diameter; or up to 8 inches when used with the Ridgid universal drive shaft.

The Porta-Power drive has a 3-jaw lathe-type scroll chuck in front and a self-centering workholder in the rear which turns with the pipe. Additional features claimed by the manufacturer include a special chuck wrench ejector for removing wrenches when the operator forgets, a bump-proof start-and-stop switch, and permanent sealed-in lubrication. The unit has a reversible motor and plugs into any 110-volt ac circuit. It measures 19 1/4 x 18 inches at the base, and is 12 inches high.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 71.

Construction Hand Tools

Miscellaneous hand tools for use on construction projects are described in a data sheet issued by The Klein-Logan Co., S. 13th & Breed Sts., Pittsburgh, Pa. These include stevedore bars; cutters, picks, and asphalt mattocks; grub hoes; clay or contractors' picks, points and chisels; clawbars with heel; crow bars; hammers; bull points; and chisels.

The sheet illustrates each of these items, and lists the sizes in which they are stocked. Where relevant, the sheet

gives the length, weight, and other information on these tools.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 78.

Re-Grouing Tractor Treads

Data sheets on its line of special Manganal welding bars for use in re-grouing worn tractor treads have been made available by the Stulz-Sickles Co., 134 Lafayette St., Newark 5, N. J. These bars are made in five shapes and can also be used for replacing bucket lips and similar uses.

The data sheets describe the material from which the bars are made, tell how they are applied, and include other pertinent information about their use. A

special feature of the folder is a table which gives the required number of feet of material needed for repairing the treads on several makes and models

of tractors.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 45.

Plan NOW for NEXT WINTER

with
DAVENPORT-FRINK SNO-PLOWS
for
FASTER • SAFER • CLEANER SNOW REMOVAL



ALL TYPES AND SIZES

Right now is a good time to check over your snow removal equipment. It's never too early to order new units or repairs for your present equipment. Planning well ahead of next season will enable you to avoid the inevitable snow-time rush. We'll cooperate with you in every way.

DAVENPORT BESLER CORPORATION

Made in Eastern U.S.A. by CARL H. FRINK

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100 Islands, CLAYTON, NEW YORK

HERCULES
ENGINES AND POWER UNITS

In-Service Training Offered CE Graduates

Connecticut Plan Offers Students
Two Years of Practical Experience
In Units of the Department

By G. ALBERT HILL, Connecticut State
Highway Commissioner

★ A SYSTEM of in-service training for graduates in civil engineering has been established in the Connecticut State Highway Department. The plan provides for a two-year period of varied practical experience in the several units of the Department. It offers the graduate an opportunity to acquire a comprehensive picture of the application of the theory he learned as a student.

It is felt that the plan will be of benefit both to the graduate and to the State Highway Department. It reduces the one-sidedness that has developed under the older system whereby the graduate was dropped into a particular niche from which escape was impossible for years, if ever.

Eligibility

Under the provisions of the Connecticut Merit Law (Civil Service) prospective trainees should be legal residents of the state and graduates in civil engineering of approved engineering schools. These two conditions provide eligibility to apply for the state merit-system examination for Senior Engineering Aid. Candidates accepted for training will be appointed to that title provisionally, pending examination. Candidates who have passed the examination prior to appointment will have eligibility for regular instead of provisional status.

Scope of Training

As this is written, two appointees who graduated in mid-year are undergoing the training, and ten more seniors are seeking appointment following spring graduation. The scope of the training is indicated by the schedule for the two current trainees. This provides nine months of work in the Bureau of Engineering and Construction, four in Highway Planning Studies, four in Maintenance, three in Boundary and Right-of-Ways, and two in Materials Engineering at the Department laboratory. The remainder of the training period is accounted for by vacation time.

Salary

The current salary brackets for Senior Engineering Aid are \$2,340 to \$2,940 annually, starting at the low amount and advancing \$120 a year to the top figure. Currently, the additional sum of \$120 is added yearly to salaries at this grade. Between March 1, 1948, and December 31, 1948, a further 10 per cent of base pay, computed bimonthly, is being paid to state employees.

Engineering graduates or seniors in civil engineering who meet the merit-system requirements may be assured that their applications will be welcomed.

Marion Representatives

A. William McGraw has been appointed representative of the Marion Power Shovel Co. in sections of Missouri and Illinois. Mr. McGraw will work from the company's District Office at 411 N. 7th St., St. Louis, Mo.

Mervyn W. Martin is now Marion's representative in the territory comprising California and Nevada. For the past two years Mr. Martin has been Manager of the Shovel & Crane Division of the Shaw Sales & Service Co. of Los Angeles. He will work out of the San Francisco office at 571 Howard St.

The appointment of Paul Fenwick as

Manager of its New York Sales Office has also been announced. Mr. Fenwick, who took over his new duties in June, has served in similar capacities in two other construction-equipment firms. From his headquarters at 420 Lexington Ave., New York City, he will supervise export sales as well as domestic sales in the New York area.

Safety Record Established

A world safety record is claimed by construction forces working at the Belle, W. Va., plant of E. I. du Pont de Nemours & Co., Inc. This group has completed 3,417,291 man-hours without a disabling injury, thus surpassing the previous world record set by a du Pont construction force working at the company's Chambers Works, Deepwater Point, N. J., in 1943. In breaking this record the Belle construction force worked safely through 1,129 calendar days. Average employment in the group over this period was approximately 600, including all crafts, trades, supervisory, and clerical personnel.

This achievement is attributed by the management to the active interest and cooperation of employees and supervisors in complying with the company's safety standards and regulations. In fact, the group is determined to continue this injury-free period indefinitely.

Rock-Processing Machines

Two new bulletins are available which describe the equipment made by the Crusher and Process Machinery Divisions of the Nordberg Mfg. Co., Chase and Oklahoma Aves., Milwaukee 7, Wis. This equipment includes jaw and gyratory-type primary crushers; standard, short-head and intermediate cone, and impact-reduction crushers; apron and pan feeders; Symons vibrating-bar grizzlies, horizontal vibrating screens, rod-deck screens, and Hydro-sizer screens; ball, rod, tube, and compartment grinding mills; and other special machinery.

The catalogs point out the features of each of these units, list the special purposes for which each is suited, and the sizes in which it is made. Also discussed are the construction and operational features of the machines.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 20.

Bar and Pipe Benders

Pipe and bar-bending equipment is described in literature issued by Tal Bender, Inc., Milwaukee 2, Wis. These benders are made in many sizes and styles to fit contractors' needs.

The catalogs explain the features of the benders, show their applications and

how they are operated, and list advantages claimed by the manufacturer. The benders are grouped according to their recommended uses. The folders tell the sizes of pipe with which each one can be used, and include a price list.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 21.



Altimeters
for all preliminary surveys

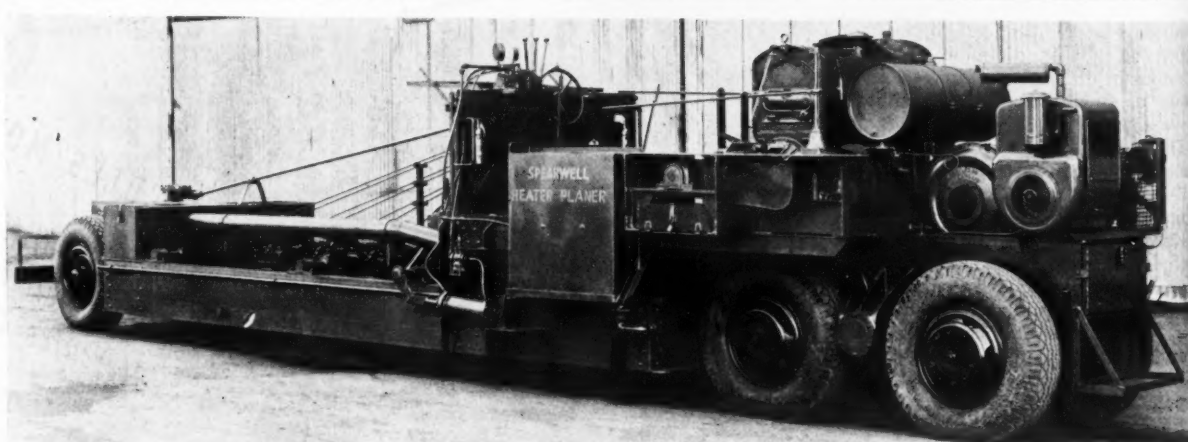
How much money will this instrument save YOU?
Preliminary surveys in 1/10th the time with accuracy better than 1 part in 1000.

Type SA-1: Range 4350' (-750' to + 3,600') in intervals of 2'
Type SA-2: Range 10650' (-200' to + 9,700') in intervals of 5'
Type SA-3: Range 15000' (-500' to + 14,500') in intervals of 10'

All models priced \$200 complete with case, hand & shoulder straps, magnifier and thermometer. IMMEDIATE DELIVERY — see your dealer or write direct for descriptive folder.

AMERICAN PAULIN SYSTEM
Manufacturers of Precision Instruments
1847 SOUTH FLOWER STREET, LOS ANGELES 15, CALIFORNIA

Altimeters



The Spearwell Heater Planer and Processor HAS WORKED ON ALMOST EVERY TYPE OF PAVEMENT SURFACE AND HAS SUCCESSFULLY

Deferred reconstruction — Decreased maintenance costs — Removed corrugations and weepings — Increased rideability — Prepared old pavements for resurfacing — restored slippery surfaces to true mosaic non-skid — Increased useful life of pavements — removed excess bitumen at extremely low costs.

ALL THIS IN A CONTINUOUS PROCESS WITH THE
REAR WHEELS ALWAYS ON THE PLANED SURFACE

Be sure to see the Spearwell Heater Planer at the Road Show—space 3215 South Concourse

SPEARS-WELLS MACHINERY CO. Oakland, California



This Weathercap is designed to keep rain, dirt, etc., out of open vertical exhaust pipes on tractors.

Exhaust-Pipe Cover

A self-operated cover for use on open, vertical exhaust pipes on all types of tractors is made by C. R. Taylor & Co. of Garden City, Kans. It is available in sizes to fit exhaust pipes ranging in outside diameters of from 1½ to 5¼ inches. The Weathercap is designed to prevent rusting of valves, to eliminate rain-flooded pistons, and to keep out rain, snow, dirt, and insects.

Balance of the Weathercap is said to permit it to close regardless of the slope on which the tractor is operating or is parked. It is claimed that it will not vibrate loose, that it will expand or contract with the exhaust pipe, and that the lightness of the lid will not allow back pressures to build up.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 92.

Portable Utility Light

A stand-mounted utility light called the Multi-Lite is made by The Pompton Mfg. Co., Pompton Plains, N. J. The column of the stand is 2½ feet high, and can be extended to a height of 5 feet. The weighted base is designed to return the stand to an upright position, even if it is accidentally tipped to angles as high as 45 degrees.

It is supplied complete with 20 feet of heavy-duty rubber-covered extension cord, an attachment for arranging the lamp in a horizontal position, light socket and switch, and a 9-inch polished-aluminum diffusing reflector.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 77.

Catalog on Truck Loader

A broadside illustrating the features of its truck-mounted loader has been issued by the Truk-Loder Co., P. O. Box 515, Tiffin, Ohio. The folder has photographs which show the unit at work in truck-loading operations, and gathering snow, cement, brick, and other materials. It also illustrates the snow plow and other attachments available for use with the Truk-Loder.

The bulletin explains why the unit is suitable for these applications. It shows how it is attached and taken down. And it includes a list of specifications and dimensions of the Model A loader.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 40.

Asphalt Company Is Formed

The Highway Co. of Hartford, Ill., has expanded its facilities for the processing and distribution of Trinidad asphalt throughout the midwest. This company has announced the formation of the Trinidad Highway Co., Inc., located at Zionsville, Ind., to take over the manufacture and wholesale distribution of Trinidad. The Highway Co. will continue to function as distributor in Indiana.

The new firm will serve the states of Indiana, Illinois, Michigan, Wisconsin, Kentucky, Iowa, Missouri, and Tennessee. C. G. Alfs is President of the company; G. J. Osterfeld is Vice President and Sales Manager; and F. F. Havey is

Secretary-Treasurer. Mr. Havey will also serve as Technical Advisor.

Soil-Compaction Bulletin

The report of the Committee on Compaction of Soils has been made available in booklet form by the American Road Builders' Association, 1319 F St., N. W., Washington 4, D. C. It discusses advances in compaction theory, procedures, specifications and contract inspection, and compaction equipment. Each of these subjects is treated from the viewpoints of the engineer, contractor, and equipment manufacturer.

Technical Bulletin No. 120, 1947, is 39 pages long, and covers each phase of the practice of soil compaction in detail. The Committee on Compaction of Soils is headed by Earl F. Bennett, Principal Soils Engineer for the New York State Department of Public Works. The Technical Committees of the ARBA are under the General Chairmanship of Harold F. Clemmer. The booklet is sent free to members.

NO BETTER DRILL for CONSTRUCTION WORK!



The Van Dorn ½" Standard Drill is high-powered; sturdy enough to withstand rough usage on the job; yet it's easy to handle, without an ounce of excess weight. Exactly the features you need for intermittent construction drilling! It drives twist drills up to ½" in steel; wood augers up to 1" in hardwood; Hole Saws up to 3½" in diameter. It's powered by a husky Van Dorn universal motor, tailor-made for this Drill—to get jobs done faster, at lower cost! See your nearby Van Dorn Distributor. Write for free catalog to: The Van Dorn Electric Tool Co., 787 Joppa Road, Towson 4, Maryland.

For Power
Specify

Van Dorn

(DIV. OF BLACK & DECKER MFG. CO.)
PORTABLE ELECTRIC TOOLS

HURSTCO INCORPORATED

Manufacturers of

Concrete Sawing and Breaking Equipment

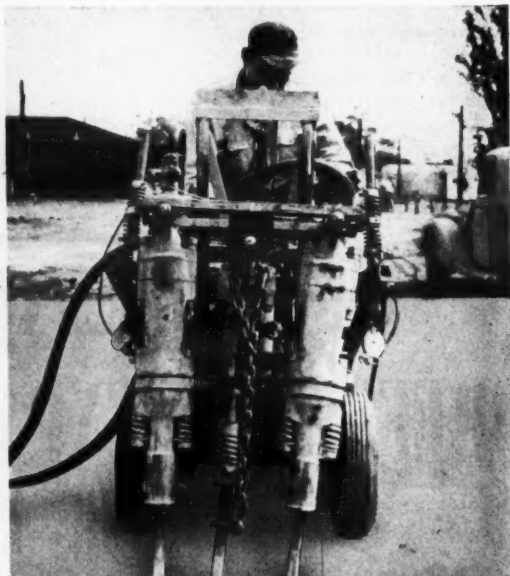
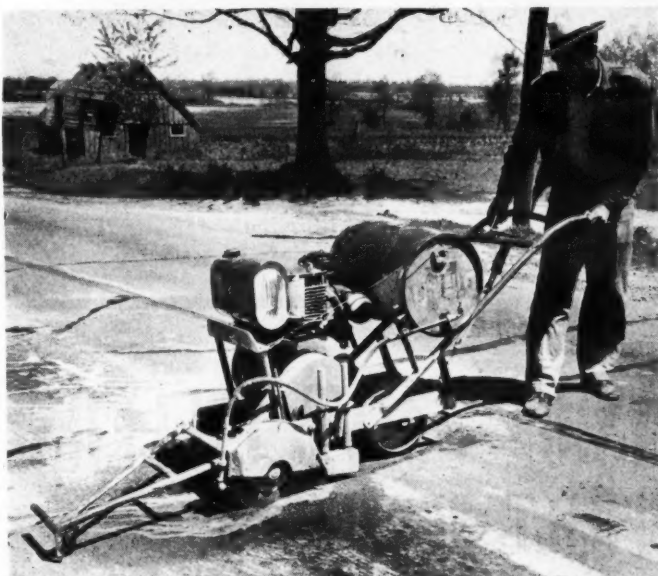
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Announces

The TWINS that can't be beat!

FOR SPEED and ECONOMY in the REMOVAL of CONCRETE

CONCUT Jr. SAW and CONCUT Jr. BREAKER



RESULTS OF SAWING AND BREAKING

CONCUT JR. SAW

1. Perfect joint.
2. Non-hazardous.
3. No trim-up cost.
4. No loss of time due to trim-up.
5. Entire maintenance cost cut 50%.
6. Surface strength unsurpassed for repair.
7. No additional material.
8. Noise disturbance cut 50%.

CONCUT JR. BREAKER

1. Mechanical, self propelled breaker.
2. Speed 6' to 8' per minute on 3" to 4" pavement.
3. Speed 5' to 7' per minute on 4" to 6" pavement.
4. Mechanically operated to pry concrete loose.
5. With our added weight on the drop and being pneumatically lifted, a very large range of breaking tools may be used, giving a greater breaking area.

Write today for complete information and name of nearest distributor.



HURSTCO, INCORPORATED

Manufacturers of CONCRETE SAWING AND BREAKING EQUIPMENT

117 EAST COLORADO ST.,

PASADENA, CALIF.



SAW CONCRETE and BREAK FASTER

With CONCUT JR. SAW

With CONCUT JR. BREAKER



Work proceeds at the Castro Filho Dam in Ceara, Brazil. Luis Saboya Albuquerque Co. is handling the construction. Above left, two Caterpillar tractors equipped with bulldozers prepare the dam bed. Above center, and at right, Caterpillar D7 tractors with Caterpillar No. 7A bulldozers remove rock and dirt. Those are Brazil "cowboys" in the center photo.

Pneumatic Conveyors

Pneumatic conveying systems for handling cement and other lumpy, granulated, or powdered materials are manufactured by the Convaire Corp., 508 Third Ave., Pittsburgh 19, Pa. Air or inert gases can be used as the conveying medium, and can be regulated, according to the manufacturer, to carry from 1 ounce to several tons of material per minute. The automatic system is controlled by one man at a central control panel.

Among the advantages claimed by Convaire for its conveyors are the following: the entire system is self-cleaning; it can be operated manually, automatically, or by remote control; it will handle any conveyable material horizontally or vertically; it uses low-pressure air during the conveying cycle; the blowers deliver air directly to the activator, and only while the conveyor is in operation; pipes can be suspended from any support; there is no segregation or waste of materials; and the motor and blower are the only moving parts during the conveying cycle.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 37.

Safety-Goggle Posters

Posters stressing the use of safety goggles are being distributed free by Watchmoke Optical Co., Inc., 230 W. Exchange St., Providence 3, R. I. These safety-program aids are printed in bright colors and in standard poster size with a wide range of messages.

Watchmoke Optical Co. manufactures a complete line of safety goggles to fit many needs. They include the Eye Savers cover-all goggles with Impax

plastic lenses for protection against eye injury from any angle; the Stoaways, spectacle-type glasses that fold to cigarette-pack size; and the TucAway goggles made with replaceable Impax plastic lenses and telescopic Retrax metal temples. Literature on the complete line is available. It points out the features of each of these goggles, de-

scribes the tests to which they have been subjected, the sizes and styles in which they are made, and other data. Types of goggles for special uses are also available.

Copies of the posters or of the literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 43.

Dravo Agent in New York

Walter P. Barrett is Manager of the New York District Office of the Dravo Corp. of Pittsburgh. He formerly held the position of Assistant Manager of the company's Machinery Division District Office in Philadelphia. The New York office is located at 30 Church St.

SEALTEX being applied to mass produced concrete pilings for U.S. Navy piers.

SEALTEX concrete curing compounds meet the exacting specifications of the Bureau of Reclamation, Army and Navy, other Federal agencies; State Highway Departments, Counties, Cities, Engineers and Architects.
CLEAR • WHITE-PIGMENTED • GRAY-PIGMENTED • BLACK

TECHKOTE COMPANY • INGLEWOOD, CALIFORNIA

SEALTIGHT

REG. U.S. PAT. OFF.

PREFORMED EXPANSION JOINT FILLERS AND OTHER ASPHALT PRODUCTS

Expansion Joints, using a preformed filler of bituminous content and a means of load transmission between the adjoining slabs, have, over a period of years, proven their high value in prolonging the life of the structure and reducing maintenance costs.

A SEALTIGHT expansion joint filler is available to meet any standard specification requiring a bituminous preformed filler.

SEALTIGHT Preformed Bituminous **ASPHALT** Expansion Joint consists of 75 to 80% pure blown asphalt held together in a tough, shock-resistant mass with a fibre binder. Two layers of saturated felt paper give added strength and rigidity for handling purposes.

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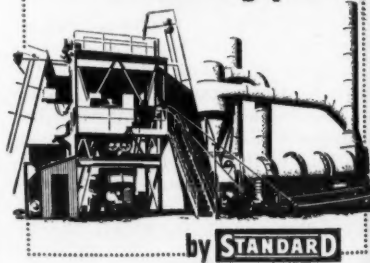


Other Products include:

For blacktop surfacing and maintenance: cutback asphalts, paving asphalts and road oils in tank car lots; emulsified asphalts in tank cars or drums. For concrete construction and maintenance: Asphalt crack fillers and joint fillers (drums) including Fed. Spec. SS-F-336. Also sewer joint compounds, asphalts for waterproofing, and preformed asphalt closure strips for corrugated sheeting.

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Dual Concrete Road Is Built Outside City

Grading for New Location Done Before War; Median Strip Separates 23-Foot Lanes on 1½-Mile Contract

ANOTHER section has been added to the four-lane dual concrete portion of Louisquiset Pike, State Route 146, north of Providence, R. I. This 1½-mile stretch on new location through the town of Lincoln leaves only about 5 miles of 18-foot pavement between the south end of the present work and the Providence city line. North to the Massachusetts state line the Pike is in part four-lane highway and in part two-lane.

Grading for this new piece of road was done before the war, and last summer when the Rhode Island Department of Public Works awarded a contract for the paving, it marked the first concrete-highway paving job undertaken in the state in six years. The project got under way the latter part of July, 1947, and the pavement was completed on November 13, just two days within the seasonal time limit for this type of work. Because of the mild autumn weather, a one-month extension had been granted beyond the usual October 15 deadline on concrete paving. The M. A. Gammino Construction Co. of Providence, which also did the original new-location grading, was awarded the paving contract on its low bid of \$523,775.

The contract also includes a complete interchange at the intersection of Louisquiset Pike with Washington Highway, about midway on the project. The bridge itself, which carries the Pike over Washington Highway, was completed in a previous contract, the first reinforced-concrete highway grade-separation structure built in Rhode Island. But the access and approach roads to the structure, both grading and paving, are included in this contract. About 1.3 miles of roads are required at the interchange, varying in width from 24 to 30 feet. They will be paved with bituminous penetration macadam. This phase of the work, which will complete the contract, will not be finished until this summer.

New Dual Highway

Louisquiset Pike, Route 146 north out of Providence, is a heavily traveled artery of commerce used by the big truckers hauling from the port city into the heart of New England. Coal and oil transport trucks seem particularly to favor this route. The 4-mile section from the north end of this contract to the Woonsocket city line has two 23-foot concrete pavements separated by a 6-foot median strip; the remaining 5 miles to the Rhode Island-Massachusetts line at Uxbridge is in part 2-lane and in part 4-lane concrete, not divided. This is Route 146.

The section south of the dual highway leading into Providence has only an 18-foot concrete pavement, so naturally bottlenecks are inevitable. This is especially true when the horse races are held at a track bordering on the narrow section of road. Eventually the dual highway will be extended to the Providence city line, and the present 1½-mile job is part of that long-range improvement.

This contract is on new location east of the existing road, and connects with the present dual highway on the north. At its south end, a temporary black-top connection is made back to the original 18-foot road.

The new roadway is 68 feet wide. It consists of dual 23-foot pavements of 8-inch uniform reinforced concrete,

separated by a 6-foot median strip and flanked by 8-foot shoulders. The 23-foot pavement is laid in two lanes, an 11-foot inside lane and a 12-foot outer lane for passing. The slabs have a butt longitudinal joint without connections, with a crown at this point of ¼ inch to the foot. The concrete is laid on a gravel foundation course, 16 inches thick in the cuts and 22 inches in the fill sections, and which extends out under the shoulders.

Slabs are 73 feet 6 inches long between expansion joints. The expansion joints are ¾-inch-thick x 7-inch-deep cork filler, cut in 11 and 12-foot lengths for the respective lanes. The joints are supported in Bethlehem steel joint assemblies; they were capped with chan-

(Continued on next page)

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TRAILBUILDERS

Dual Concrete Road Is Built Outside City

(Continued from preceding page)

nels having 3-inch lips which were later removed by the finishers. There are no contraction joints.

Pavement reinforcing includes a 5/8-inch round deformed bar, 16 and 15 feet long respectively for the 12 and 11-foot slabs. The bars are bent in the shape of a channel, and placed about 3 inches below the top of the concrete on both sides of the expansion joints. The steel is also 3 inches back from the joint and from the sides of the slab. The Plantation Steel Co. of Providence supplied the bars.

Mat reinforcing was also placed in the concrete over the entire slab, 2 inches below the surface. Bethlehem Steel Co. furnished the steel fabric which weighs 46 pounds per 100 square feet. The mat went on top of the bars near the joints.

The median strip, which has an 8-inch layer of loam on top, is bordered by concrete curbing with a sloping face. At the edge of the 8-foot shoulders is a granite curb, 8 x 17 inches, beyond which the slopes are covered with 4 inches of loam and then seeded. The gravel roadbed also serves as a foundation for the 8-foot shoulders which are topped with 2 inches of pre-mixed sand and tar.

In cuts and fills 10 feet or less, the side slopes are 3 to 1; when they are over 10 feet the slopes are 2 to 1.

The pavement for the roads at the interchange consists of a 16-inch gravel foundation, and an 8-inch course of bituminous penetration macadam on top of that.



C. & E. M. Photo

This is the batch plant M. A. Gammino set up for the section of dual concrete road it built in Rhode Island. At left is a Butler 500-barrel cement bin and on the right is an Erie 3-compartment 100-ton AggreMeter.

Grading

Since it had been 6 years since the new location was graded, the roadbed had to be cleared again in preparation for the paving. During those years a stand of locust trees had sprung up in the sandy soil, attaining a diameter of 4 inches. The small trees and brush were cleared away by dozers, which with the motor graders put the roadbed in shape once again.

Some fairly heavy grading was required around the interchange structure, for these access and approach roads had not been graded when the bridge was built. This work was carried on along with the grading of a new section of Washington Highway which the M. A. Gammino Construction Co. also had under contract. This other contract carried Washington Highway east from its intersection with Louisquisset Pike

to State Route 122 at Ashton, R. I. A dual concrete pavement will be laid on this job during 1948.

Gravel for the foundation course was

dug from a pit by a Northwest 1 1/2-yard shovel and loaded into 6-yard Autocar trucks—there were 12 of them on the job. The average haul was 1 1/2 miles. Two Caterpillar motor graders and three D8 tractor-dozers spread and compacted the gravel which was also rolled by a Buffalo-Springfield 12-ton tandem roller.

Blaw-Knox forms were then set by hand, and the grade checked with a scratch template. About 10,000 linear feet of forms was available on the project, and 500 feet of grade and forms was always prepared ahead of the paver. The grade was given a final rolling by a Buffalo-Springfield 7-ton tandem roller, wet down when necessary, and the forms oiled in preparation for the concrete. For the first three lanes the paver worked outside the forms, but for the last lane, the outer lane at the extreme west, it worked within the forms since it was not permitted to use the new concrete. On the final lane the joints could not be installed, of course.

(Continued on next page)



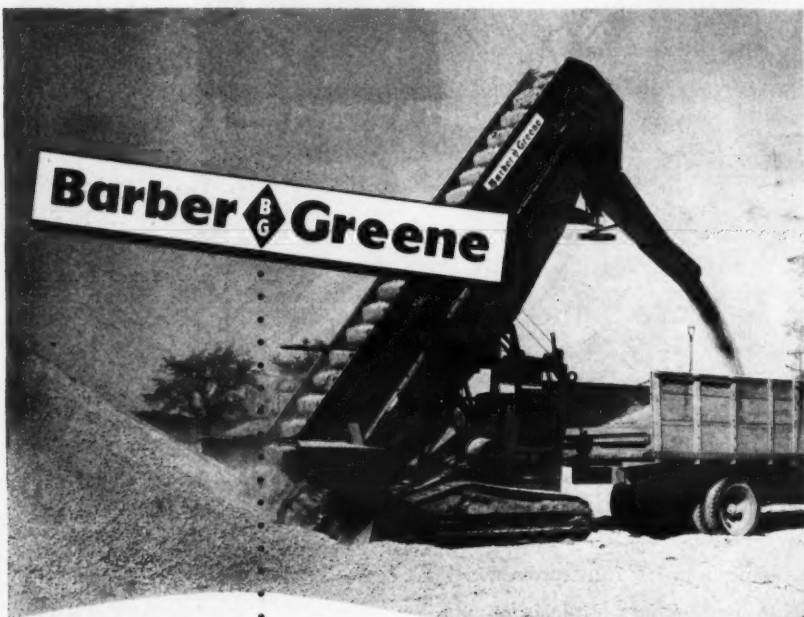
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C. & E. M. Photos
This MultiFoot 34-E single-drum paver, which M. A. Gammino Co. used on its contract to build a new section of Louisquisset Pike, averaged about 60 cubic yards per hour. Right: although for most of the job a concrete spreader was also used, here the paver is running a batch of concrete out on its 36-foot boom, and dropping it directly in front of a Blaw-Knox double-screed finishing machine, on top of the steel mesh reinforcement.

until after the paver had passed.

Batch Plant

The batch plant for the concrete paving was set up at the Washington Highway interchange between the new location and the existing road. North American cement was shipped from the Howes Cave, N. Y., plant in bulk cars to the Albion, R. I., siding of the Providence-Worcester Division of the New Haven Railroad. A small Blaw-Knox 75-barrel cement bin was set up at the siding, and the cement was transferred from the cars to the bin by a worm gear and enclosed bucket elevator.

When a car was being unloaded, two 5-yard trucks picked up cement at the small bin and hauled it 2 miles to the batch plant. The trucks held from 20 to 25 barrels of loose cement, and were covered with canvas as protection and to keep the cement from blowing away. At the batch plant the cement was dumped into a hopper at the bottom of which was a worm gear that moved the material along to an enclosed elevator. The elevator raised it to a Butler 500-barrel cement-storage bin.

Sand and crushed gravel for the aggregate was hauled from the contractor's own gravel plant at Seekonk, Mass., 12 miles from the project. The hauling was usually done by Mack trucks which stockpiled the material alongside a 3-compartment 100-ton Erie AggreMeter. Three compartments were required to accommodate the sand and two sizes of gravel. The bins were loaded by a P&H crane equipped with a 70-foot boom and a 1 1/4-yard clamshell bucket. A D8 dozer pushed the material to the crane.

Six batch trucks, holding two batches each, hauled the cement and aggregate to the paver; the maximum distance was 3/4 mile. The trucks first backed under the aggregate bin for a load, and then drove under the other bin to pick up the cement. Next they went up an access ramp to the new Pike. And as soon as one of the concrete lanes was completed, they operated over the pavements to reach the paver. The batch trucks were hired by the hour.

Water for the mix was pumped out of
(Concluded on next page)

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C. & E. M. Photo
Workmen on the Louisquisset Pike set a Bethlehem steel assembly for a cork-filler expansion joint, driving three stake pins behind it to hold the joint.

Dual Concrete Road Is Built Outside City

(Continued from preceding page)

a lime-rock quarry at the south end of the job by a Jaeger 4-inch pump directly into a 1,000-gallon tank truck. Another similar truck, a Mack with a 1,000-gallon tank, was stationed always at the paver to keep it supplied with water through a 75-foot length of 2-inch hose. Each truck had a Marlow 2-inch pump. The truck which carried the water from the quarry pumped the water into the other tank, and from there it was pumped to the paver.

The Mix

The weights of a typical 8-bag batch of concrete were as follows:

Cement	752 lbs.
Sand	1,600 lbs.
Gravel, 2½ to 1¼-inch	1,488 lbs.
Gravel, 1¼ to ¾-inch	992 lbs.
Water	35 gals.

The gradation of the sand and the two types of gravel fell within the following limits:

Coarse Aggregate	
Sieve Size	Per Cent Passing
2½-inch square sieve	100
2½-inch square sieve	85-100
1-inch square sieve	40-75
¾-inch square sieve	20-50
No. 4 sieve	0-10
Fine Aggregate	
Passing ¾-inch sieve	100
Total retained on 20-mesh sieve	30-60
Total passing a 50-mesh sieve	7-30
Passing 100-mesh sieve	3-8

Concrete Operations

Paving started on October 11, and the MultiFoote 34-E single-drum paver with a 36-foot boom averaged about 60 cubic yards per hour when it was running. Batches were mixed one minute and then the concrete was deposited between the forms in front of a Blaw-Knox spreader. After making a pass which leveled off the material at the required depth for placing the steel reinforcement, the spreader reversed so that more concrete could be dumped on top of the mesh. The concrete was then struck off level with the forms by the spreader, which was followed by a Blaw-Knox double-screed finishing machine. The concrete was not vibrated, but was spaded along the sides.

After two passes of the finishing machine, the surface of the concrete was hand-floated by one of the finishers using a board float with a long handle. The float was a 6-foot piece of a 1 x 6-inch board. He then checked for any irregularities with a 10-foot straight-edge. A strip of web belting, ¼ inch thick and 14 inches long, reaching across the width of the slab, was next pulled over the surface as a smoothing aid. This was followed by a burlap drag, 18 inches long and the full width of the lane, in order to remove any laitance.

When the concrete had set slightly, a steel broom was pulled transversely over the slabs leaving slight marks in the surface. Working from their bridges, the finishers edged the expansion joints and the longitudinal joints with a ½-

inch edging tool, and removed the steel caps from the cork filler which was left one inch low. On the outside edges the finishers used a ¾-inch edging tool.

The concrete was cured with Sisalkraft paper, which was put on in 12-foot rolls and held in place with stones. After four days the paper was removed, but no traffic was permitted until after seven days had passed. Only the very northern section was used by the public where the new road tied in to the other dual highway. The section of new location did not have to be opened until the contract was fully completed. The 1-inch-deep openings at the expansion joints were filled in with Sealz, a U. S. Rubber compound, which was first

heated in an Aeroil heating unit.

Quantities and Personnel

The major items on the 1½-mile dual highway paving contract included:

Unclassified excavation	96,122 cu. yds.
Gravel foundation	60,000 cu. yds.
Crushed stone for macadam pavement	9,893 tons
Pre-mixed shoulder surfacing	22,491 sq. yds.
Reinforced-concrete pavement	9,343 cu. yds.
Bitumen	74,674 gals.
Steel reinforcing bars	103,422 lbs.
Steel reinforcing mesh	43,779 sq. yds.
Granite curb	14,795 lin. ft.
Concrete curb	13,952 lbs.

For the M. A. Gammino Construction Co., William Dimitri was Job Superintendent on the Louisquisset Pike contract. Frank Gammino is General Superintendent of the company.

The Rhode Island Department of Public Works, Division of Roads and Bridges, was represented on the project by Walter E. French, Resident Engineer. The Division is headed by George H. Henderson, Principal Highway Engineer, with Lee V. Spencer as Road Construction Engineer.

Sisalkraft Ohio Warehouse

Complete warehouse facilities in Cleveland, Ohio, have been established by The Sisalkraft Co., maker of building papers, road-curing blankets, and other products. All Sisalkraft products will be handled at the new warehouse which is located at 3540 Croton Ave.

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✓ SPEEDS: Six forward—1.30 to 14.69 m.p.h.
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✓ Exclusive Tubular Frame.

✓ 28-inch working throat depth
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✓ Full Blade Visibility; Simp-
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Questions and Answers On Air-Entrained Concrete

A digest of questions and answers about air-entrained concrete has been prepared by the Autolene Lubricants Co., 1331 W. Evans St., Denver 9, Colo. Autolene manufactures an air-entraining agent called Protex. It also manufactures a special automatic dispenser for discharging the proper amounts of Protex into each batch.

The pamphlet discusses the use of Protex Vinsol air-entraining agent, and answers such questions as what is air entrainment, how is air-entrained concrete placed, what advantages accrue from its use, how does air-entrained

concrete made with Protex react to standard tests, how does vibration affect it, how does it stand up when used for making precast shapes, etc.

The Autolene pamphlet is well illustrated and shows several jobs on which Protex has been used. It lists the approvals granted to Protex, and also contains a list of selected references on air-entrained-concrete procedures.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 110.

Catalog on Rolling Doors

A 28-page catalog about a complete line of rolling doors for garage and

maintenance shops can be secured from The Kinnear Mfg. Co., 820 Fields Ave., Columbus 16, Ohio. These include service-type doors, fire doors and shutters, Rol-Top doors, hangar doors, steel rolling grills, and doors for special application.

Each of these types of doors is made in a wide range of styles and sizes to meet specialized needs. The folder lists these various sizes, and suggests recommended uses for each type of door. Special features of construction are described in detail by means of sectional illustrations accompanied by text.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 48.

Anti-Slipping Compounds

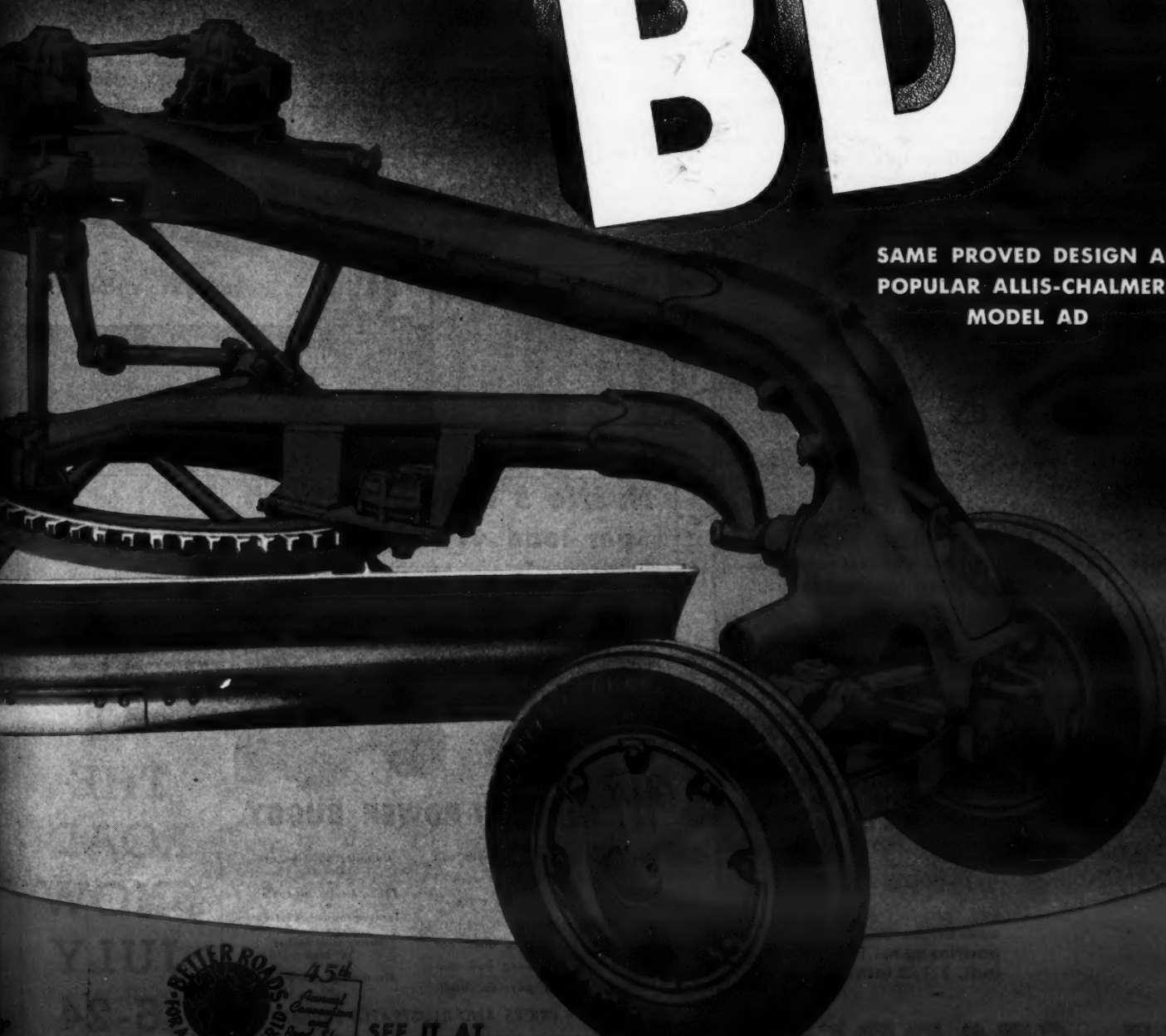
A folder describing its line of anti-slip products can be obtained from the American Abrasive Metals Co., Irvington 11, N. J. The products listed in this bulletin include Ferrox, Fera-Mat, Martex, Feralun, and Fera-Flow. Ferrox is described as an anti-slip floor troweling composition; Fera-Mat as an anti-slip floor covering; Martex as anti-slip plastic nosings and strips for stairways; Feralun as anti-slip floor treads and floor plates; and Fera-Flow is an anti-slip floor paint.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 36.

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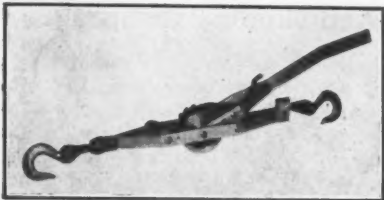
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The Pow'r Pull one-man-operated hoist weighs 6 pounds and has a 3/4-ton capacity. It can be used for both vertical or horizontal pulls.

Lightweight Hoist Has 3/4-Ton Capacity

A lightweight one-man-operated hoist is announced by the American Gage & Mfg. Co., 125 Bayard St., Dayton 1, Ohio. Known as the Pow'r Pull, it weighs 6 pounds and is said to have a 3/4-ton capacity. According to the manufacturer, it has a 14 to 1 power rate. It can be used for hoisting, pulling, or similar operations.

The Pow'r Pull is made of high-tensile manganese bronze, aluminum bronze, Duraluminum, aircraft cable, and cadmium-plated steel. It can be used for both vertical or horizontal pulls. The manufacturer guarantees it at 1,500-pound capacity with 50 per cent overload, or 2,250 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 26.

Data on Cone Crusher

Data on the operation and construction of the TelSmith Intercone crusher are contained in a bulletin issued by the Smith Engineering Works, 532 E. Capital, Milwaukee 11, Wis. This unit is described as an all-steel high-speed reduction crusher featuring a

conical head which gyrates within an outwardly flaring curved bowl. The catalog describes this feature of the crusher in detail and tells how it aids the crusher's efficiency.

Highlight of this 8-page folder is a large cutaway drawing of the machine in which arrows point out its parts and text tells how they contribute to the operation of the unit. Bulletin No. 270-A lists complete specifications, capacities, and dimensions. It describes the feed, adjustment of discharge opening, replacement of parts, production, costs, and aggregate produced.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 113.

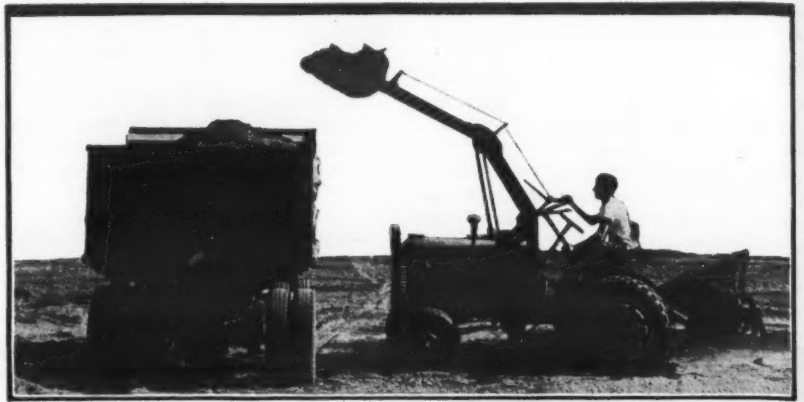
Portable Drier Has Capacity of 5-10 Tph

A portable aggregate drier is made by the Moorhead Machinery & Boiler Co., 927 Second Ave., Minneapolis 14, Minn. Principal component of the machine is its 16-foot-long trundle. In traversing this trundle material is dried and heated by the flame of the burners. According to the manufacturer, exit temperatures of the material run as high as 480 degrees F. The flame of the burners is adjusted by a control valve.

The trundle is chain driven through a speed reducer. Power is provided by a 3 1/2-hp air-cooled Wisconsin gasoline engine. A Viking rotary pump supplies fuel to the burner at constant pressure by means of a by-pass valve. The unit is equipped with disk wheels. Adjustable legs at the front and rear are used to regulate the inclination of the machine. Its capacity is said to run from 5 to 10 tons per hour. It can also

be furnished with an electric motor and with skids for permanent installations. The drier weighs 2,900 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 83.



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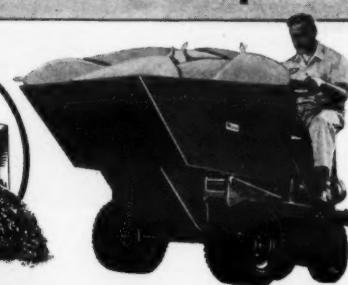
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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Unexpected Soil Conditions On Subway Excavation

THE PROBLEM: Tunnel construction for a municipal subway proved more burdensome to the contractor than contemplated; unexpected soil conditions turned up that ran counter to the city's estimates upon which the contract was awarded. Under the following conditions, was the contractor entitled to damages?

THE ANSWER: No. (Spencer, White & Prentiss v. City of New York, 75 N. Y. Supp. 2d 629, affirmed in 271 App. Div. 824, 66 N. Y. Supp. 2d 619; appeal to Court of Appeals denied, 271 App. Div. 926, 67 N. Y. Supp. 2d 701.) The court's reasoning and conclusions, and the essential facts on which they were based, appear in the following extracts from the opinion of the New York Supreme Court for New York County, Trial Term:

"Part of such west tunnel was to be constructed in free air, which required sufficient natural rock cover over the subsoil, and part under compressed air, in which metal tubing and other added equipment is essential. The contract and drawings state with some particularity those parts of the tunnel in which the different methods of construction were to be employed, but are nevertheless replete with warning to the contractor that such estimate is necessarily inexact, subject to conditions actually to be encountered in the field, and that the risk of variance is entirely on the contractor. Indeed the very uncertainty is the reason for the adoption of the unit-price, rather than the lump-sum contract, and it may be fairly assumed, on the evidence, that the risk is reflected in the price . . .

"There would seem to be no basis for the claim that the city's failure to allow additional preliminary borings at the city's expense, investigatory of the rock cover over the route of the west tunnel, resulted in crystallization of the estimates in the contract and drawings into warranties of the conditions there set forth. Even if the borings actually taken were plainly inadequate, in the absence of bad faith, concealment of information at hand, or conscious misrepresentation, the city is not liable. . . . Moreover, with regard to the borings made it is stated (drawing A-1) that such borings 'do not show the actual surface of rock because the earth and rock formations underlying the City of New York are very irregular.'

"The city clearly did not guarantee, and plaintiff's testimony is that . . . there was no reliance on the estimate given, that the respective quantities of the types of work set forth would actually be done, for the contract (Art. XIII) expressly provides: ' . . . The contractor shall make no claim for damages or for anticipated profits or for loss of profit because of a difference between the quantities of the various classes of work actually done or materials actually delivered and the estimated quantities of items stated in the Contractor's Proposal, or because of the entire omission of any of the quantities of items stated in the . . . Proposal.'

"In the course of the work on the west tunnel, in free-air operations, a dangerous slide or run occurred followed by delay of about seven months. When the work was resumed the city engineer ordered radical changes. But the contention that these changes give rise to a cause of action or are in breach of contract is untenable, as such orders have not been shown to be gratuitous or unnecessary departures from the contract . . . [nor has it been shown] that the work reasonably and safely could have been completed in accordance with the original contract and drawings . . .

"That the city's chief engineer, in good faith, thought plaintiff entitled to a greater return is not binding on the city, for it was not included in his final estimate, which is binding and conclusive on the plaintiff (Art. XXIV, contract), no showing having been made that the engineer's final conclusions are 'tainted with fraud or bad faith.'

Insurance Policy Covers Shovel Damaged en Route

THE PROBLEM: A contractor's power shovel was damaged from striking a concrete pillar while it was being moved along a highway underpass on a tractor-trailer unit. Was the loss covered by a policy insuring the contractor's property, including the shovel, against loss while being transported?

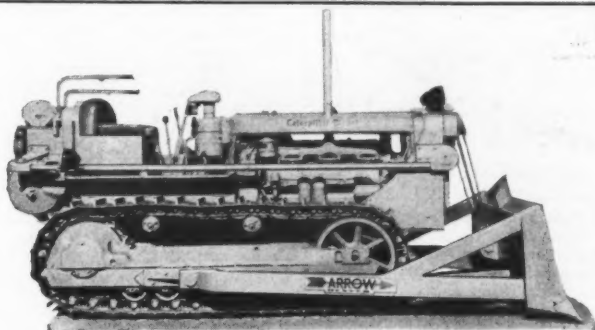
THE ANSWER: Yes. (Bucks County Const. Co. v. Alliance Ins. Co., 56 Atl. 2d 338.)

The policy insured against "collision, derailment, or overturning of land conveyances while the insured property is being transported thereon, including loading and unloading."

Upholding judgement in favor of the contractor, the court said: "There is no ambiguity in the language of the limitation of the policy relating to damage by collision. But notwithstanding the clear meaning of words in the above clause of the policy, a broader coverage may be inferred from the circumstances which indicate a wider mutual intent."

"The policy by its name, 'Scheduled Property Floater Policy', written on its 'Contractors Equipment Floater Form' implies protection to the property described in the policy, while in transit. And the character and bulk of the unusual items of property, specifically identified and described, has an important bearing upon the mutual intent of the parties, under their contract, as to the risks intended to be assumed."

"The power shovel here must have been so large as to extend beyond the side of the truck, else it could not have been damaged without contact of the truck with the pillar. (Concluded on next page)



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Avoid Legal Pitfalls

(Continued from preceding page)

A concrete pillar, upright and immobile, could not have come in contact with the load otherwise. Because of the bulk of this equipment, specifically described in the policy of insurance, the insurer should not be relieved from liability if the loaded shovel extended over the sides of the conveyance, thus protecting the conveyance from colliding with anything but subjecting the shovel to the whole impact of collision."

Gov. Not Held for Delay.

Etc., Under Dam Contract

THE PROBLEM: Under the following conditions, was the Government liable (1) for requiring a dam-contractor to use materials that the contractor thought should be wasted, (2) and for certain delays?

THE ANSWERS: (1) No. (2) No. (Wm. Eisenberg & Sons, Inc. v. United States, 75 Fed. Supp. 1006, decided by the United States Court of Claims.)

(1) The contract was so worded as to give the contracting officer discretion to determine what was to be done with materials excavated from the spillway and other works. So the court rejected a contention that the contractor should not have been required to use allegedly unsuitable materials as filling, but should have been permitted to waste them and secure proper materials from a borrow pit. That the contractor's earnings were decreased did not avoid the effect of the contracting officer's exclusive prerogative under the contract to determine the suitability of materials.

(2) The contracting officer required the contractor to complete a dike earlier than the contract specified, in order that all the work of several contractors could be coordinated. The contractor was thereby delayed in performing other features of his contract. But the court ruled that this did not render the Government liable for damages since it did not appear that performance by the contractor was rendered more expensive.

The Government was not liable for delay of contractor due to a state agency's delay in securing a site for relocation of a railroad, nor for delays caused by the railroad company, nor for delay caused by a bridge contractor. Furthermore, the Government was released from obligation (other than not to cause unreasonable delay) by a clause which provided for extension of time for construction of the dam should there be delay in relocating the railroad.

Accident on Unfinished Road—Contractor Liable

THE PROBLEM: A motorist inadvertently drove upon an unfinished part of a highway when her vision was impaired by darkness and rain. There was a barrier on the left side of the entrance to the road, but none on the right side. Coming to a complete barrier after traveling 6 or 7 miles, she turned back and was going 20 or 25 mph when her car collided with an unlighted road roller that was of the same color as the road. In the motorist's suit against the road contractor for damages, could a jury find that the accident was due to fault of the contractor and not that of the motorist?

THE ANSWER: Yes, decided the New Hampshire Supreme Court. (Savoie v. Littleton Const. Co., 57 Atl. 2d 772.) The principal conclusions of the court were:

The contractor was bound to foresee that motorists would use the road unless efficiently debarred from doing so, because it had been used by the general public before the accident.

"The lane upon which she entered was unobstructed and apparently open and suitable for travel. If signs or barriers were in the vicinity, they were unlighted and outside the range of vision."

It made no difference, as to the contractor's liability, whether or not the road had been opened to public travel by public authority. The question was whether the contractor "had conducted its operations in such a way as to lead the plaintiff reasonably to believe that the road was open to travel, and so to obligate the company to anticipate her presence".

When Mayor's Signature On Contract Not Needed

THE PROBLEM: A municipal water board was directly created by a statute which manifested no intent that the board be controlled by city ordinances, other than as specified. Under those conditions, did a construction contract entered into by the board require the mayor's signature, according to an ordinance requiring city contracts to be signed by him?

THE ANSWER: No, decided the Massachusetts Supreme Judicial Court. (Demos Bros. General Contractors v. City of Springfield, 76 N. E. 2d 166.) The statute empowered the city to prescribe the mode of payment of bills contracted by the board. But the court decided that did not render applicable to contracts made by the board an ordinance governing the execution of the city's contracts.

How Soon Must Collateral Contract Be Performed?

THE PROBLEM: A street-paving contractor promised to pave a private driveway for an abutting owner as compensation for the use of space where he could store materials temporarily. Was the contractor bound to pave the driveway immediately?

THE ANSWER: No. (Pearce v. Hollis Const. Co., 206 S. W. 2d, 15, decided by the Arkansas Supreme Court.) The court said that since no time for doing the work had been specified, the contractor had a reasonable time, depending upon all of the circumstances. A judgment in favor of the contractor, awarded by the trial court, was upheld by the Supreme Court. Both courts and the jury seem to have been impressed by evidence tending to show that the driveway was promptly graded, and that surfacing of it was reasonably delayed by the contractor on account of his paving contract with the city.



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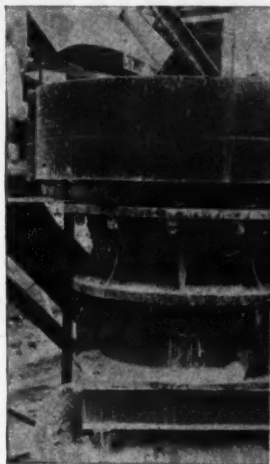
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Earth-Concrete Dam Will Control Floods

Earth-Moving Features Work The First Year; Concrete Started This Spring on East Sidney, N. Y., Dam

AS the Susquehanna, one of the great rivers in the east, sweeps southward across Pennsylvania to its wide mouth in the northern reaches of Chesapeake Bay at Havre de Grace, Md., it has often overflowed its banks, leaving death and destruction in its wake. Harrisburg, Pennsylvania's state capital, has witnessed its might. Farther upstream, the coal-mining towns and cities, such as Wilkes-Barre in the anthracite region of eastern Pennsylvania, have suffered from the fury of its raging waters in flood time. To the north, cities of central New York, like Binghamton, Endicott, and Johnson City, located on its banks have also suffered from past high waters.

To help bring the Susquehanna under control, the U. S. Corps of Engineers, Baltimore District, has a major flood-control project under construction near East Sidney, N. Y., on State Route 7-B. The project consists of a concrete and earth dam with appurtenant works now being built across Ouleout Creek, Delaware County, New York. Ouleout Creek flows into the North Branch of the Susquehanna River about 4 miles below the dam. By controlling the flow of important tributaries at the head of the river, the Army Engineers reason that they can check disastrous floods farther downstream.

A contract for the project was awarded to the Savin Construction Corp. of East Hartford, Conn., on its low bid of \$3,699,930 to the Corps of Engineers. Work got under way in May, 1947, and will take two and a half construction seasons, or until the end of June 1949 for completion.

Earth and Concrete Dam

The concrete portion of the combined earth and concrete structure is 750 feet long. It will lie across that part of the valley through which Ouleout Creek flowed, with State Highway 7-B following along on its left bank. The concrete dam is made up of three parts. At the center is a 240-foot ogee-type overflow spillway with a crest elevation of 1,203.0. On either side are 255-foot non-overflow sections rising to elevation 1,228.5. The maximum height of the masonry structure is 141½ feet above the floor of the stilling basin. Extending from the concrete to high ground on the right bank is a 1,141-foot earth embankment. To tie in the concrete with the left bank, an earth embankment only 147 feet long is required. Both embankments will also be built to elevation 1,228.5. The total length of the

combined structure reaching across the valley is 2,038 feet.

In connection with the concrete dam, a stilling basin, also of concrete, will be constructed across the width of the spillway section and extending downstream 244 feet 2½ inches from the axis of the dam. The dam will be poured in alternate monoliths, of which there are 20. The longest dimension of any monolith is 104 feet, measured along the bottom of the non-overflow section between the upstream and downstream faces. The spillway monoliths are numbered from 7 to 13; of these seven, each of the central five contains a conduit, 3 feet 6 inches wide x 5 feet 10 inches high, with the inlet elevation at 1,115.

The Federal government is furnishing the regulating equipment for these



C. & E. M. Photo

Here you are looking across Ouleout Creek from the right-bank abutment of the dam. That's a 2½-yard Northwest shovel in the foreground, loading a bottom-dump Euclid with 12 yards of dirt. A Lorain shovel is at work in the foreground.

openings; this includes the gates, hoists, and cast-iron lining for the conduits. In addition, the Government is also supplying the cement for the job. By removing these difficult-to-obtain and

fluctuating-priced items from the proposal, the Corps of Engineers stimulated more active bidding on the project. This resulted in lower costs and ex-

(Continued on next page)

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383	2½	0" to ¾"	40 lbs.	\$26.00
393	3	0" to 1"	50 lbs.	\$36.00
384	4½	0" to 1½"	84 lbs.	\$39.00
385	8	0" to 2"	153 lbs.	\$73.00

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412	3000	1½"	27 lbs.	\$25.00
413	3000	2"	29 lbs.	\$29.00

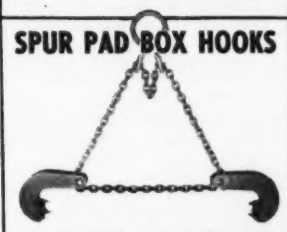
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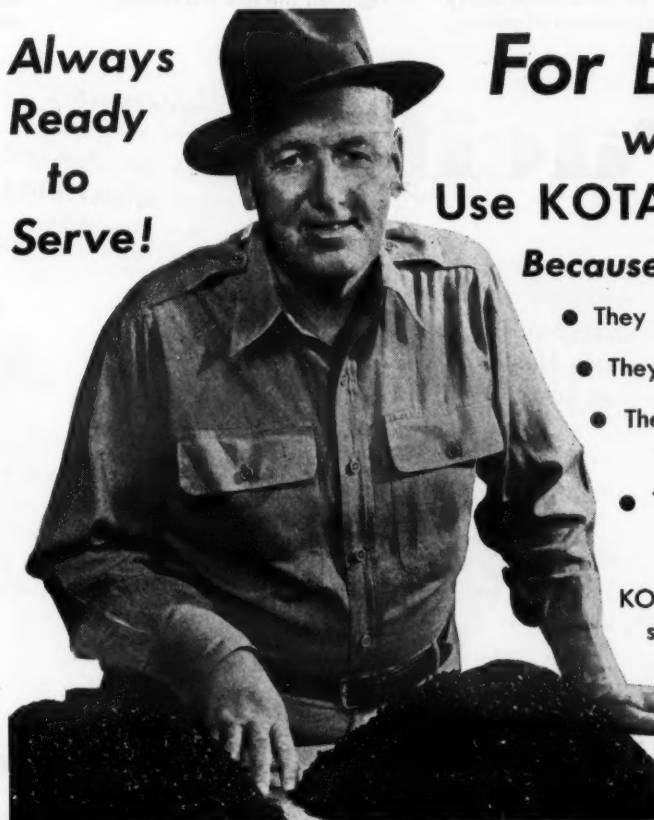


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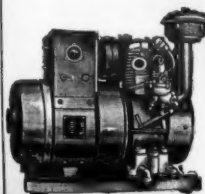
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Earth-Concrete Dam Will Control Floods

(Continued from preceding page)

pedited the start of construction.

Other features of the concrete portion of the structure include a 5-foot-wide x 7-foot-high inspection gallery running through the length of the dam, and an operating gallery through the spillway section.

The earth embankment consists of a random impervious core built to within 3 feet of crest elevation 1,228.5, and with 1½ to 1 side slopes. From the top of this core, rock fill will be placed on both faces extending downwards on 3 to 1 slopes. In addition, the upstream side will be covered with a 5-foot blanket of selected sandstone rock fill, also placed on a 3 to 1 slope. The top of the embankment, which has a 25-foot crown width, will have a 3-foot layer of gravel surfacing.

First Season's Work

One of the contractor's first moves in the 1947 construction season was to divert Ouleout Creek from its natural bed in the left half of the valley, to a position along the right downstream side. This was done to permit the construction of the first-stage cofferdam, within which monoliths 10 to 20 comprising the left half of the dam will be built. At the same time, excavation was also carried on for the foundations of both the dam and stilling basin; it included both common and rock excavation together with needed stripping.

Down in the streambed a Lorain 2-yard shovel dug a new diversion channel, while up on the sidehill a Northwest 2½-yard shovel gouged out a huge hole for the right abutment. For moving the dirt a fleet of 9 Euclids was employed. Three of these were bottom-dump units holding from 12 to 14 yards, while the other six were end-dump models. The excavated material was hauled to the top of the right bank where it was placed as part of the rolled-earth-fill dam which on that side is 1,141 feet long. To reach this embankment area, haul roads were benched into the side-hill. The up trip, which the loaded earth-movers negotiated, was on a 15 per cent grade. Coming back empty, they used a shorter route down a 30 per cent grade.

Construction Bridge

Downstream from the dam site Ouleout Creek is crossed by a single-span highway truss bridge which has a capacity of only 10 tons. This isn't strong enough to hold the heavy pieces of equipment that must be shifted from one side of the project to the other. Accordingly a work bridge was built between the old highway span and the dam site. This structure has a 22-foot roadway and will sustain a 65-ton load.

On the right bank a concrete abutment was poured, while the left-bank abutment is a stone and timber crib. The bridge has one pier, 26½ feet out from the left bank; the other span is 49 feet long. The pier is actually a steel-beam pile bent with four 14-inch H-beams, 12 feet long, placed vertically at the edge of the stream. They are capped with another 14-inch steel beam, and are cross-braced with steel angles. On the short span the superstructure consists of four 24-inch I-beams, while the long span has four 30-inch plate girders. Across the steel, 12 x 12's are laid for a deck. Outer wheel guards enclose a 22-foot roadway, which is divided in half by a timber fastened down the center as a safety measure to keep vehicles on the proper side.

Rock Work

Rock excavation was a large item on the contract, totaling 124,000 cubic yards. Most of the rock was a red or gray sandstone of varying degrees of hardness, with some shale mixed in.



C. & E. M. Photo

This picture shows the work bridge across Ouleout Creek and behind it, the highway truss span. In the left foreground, wagon drills work on the stilling-basin excavation.

Rock was encountered over large areas when digging the foundations for the dam, stilling basin, and left abutment, and averaged from 10 to 30 feet deep at these locations.

Drilling was done with four Ingersoll-Rand wagon drills powered by three air compressors, including a Worthington 500-cfm model and a 315-cfm Ingersoll-Rand. Drill steel was round and came in 6, 12, 18, and 24-foot lengths. Usually only 6 and 12-foot steel was used since the average depth of lift was around 10 feet. As the sandstone was fairly easy drilling, the bits did not have to be changed very often. Drillers started with 2½-inch and changed to 2¾ or 3-inch size when necessary. The blast holes were drilled on from 5 to 7-foot centers, both ways, and were charged with Hercules No. 2 Gelamite. The maximum charge of dynamite set off was 3 tons covering 350 holes.

Line drilling was used in clearing out

the rock on a sharply defined line for the stilling basin. Wagon drills made 2¼-inch holes on 4½-inch centers down the sides of the basin outline to a depth of 8 to 10 feet. This line of holes was 5 feet away from the blast holes, and of course the holes were not filled with a charge.

Rolled-Earth Embankment

Material for the rolled-earth portion of the dam came both from the areas being excavated and from a large borrow pit on the right bank. Job hauls ranged from 300 to 1,300 feet, up and down hill. When the dirt was dumped by the Euclids it was spread in 6-inch lifts by dozers; the contractor had four of these on the job—three mounted on International TD-18's and one on a Caterpillar D8. Compaction was secured with six passes of a twin-drum sheepsfoot roller or with three passes of a tandem twin-drum roller; a Grace sheepsfoot roller unit was used. To get the optimum moisture the fill was watered from a 2,000-gallon Mack tank truck which was filled with water pumped from the creek.

As the core of the embankment was built up, the rock fill was also placed on both side slopes. With the equipment mentioned, the average weekly production was 10,000 to 15,000 cubic yards of embankment in place. The total earth fill required for the embankment is 144,000 yards, and the rock fill is 97,100

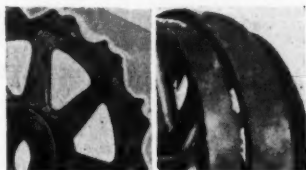
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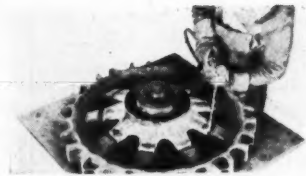
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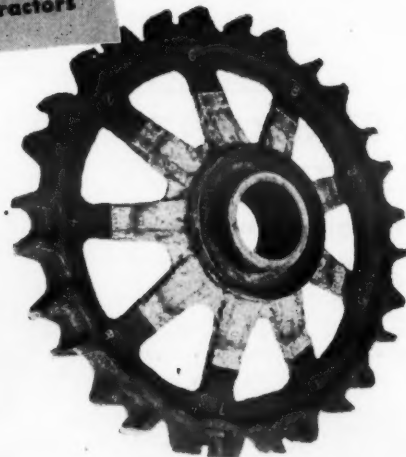
2 EXPENSIVE HUBS AND SPOKES ARE SAVED
Any experienced welder can remove the old rim and install a new one in a short time—right on the job if desired.



3 YOU OBTAIN A NEW, TOUGH, WEAR-RESISTANT MANGANESE STEEL DRIVE SPROCKET OR IDLER WHEEL RIM LIKE THESE
They last longer under severe service and cost about half what a new sprocket or idler wheel would cost.

Pacific **Renewable MANGANESE STEEL Drive Sprocket and Idler Wheel Rims For Caterpillar Track-Type Tractors** Rims

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Alloy Steel & Metals Co.

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C. & E. M. Photos

In clearing out rock for the stilling basin of East Sidney Dam, Savin Construction Corp. used line drilling and Ingersoll-Rand wagon drills, shown at left drilling 2½-inch holes on 4½-inch centers. At right, a Northwest 2½-yard shovel excavates for the right-bank abutment and Euclids move the dirt; a bottom-dump 12-yard unit has just been filled, while an end-dump 10-yard unit is next in line.

yards. Gravel for the 3-foot depth on the crown was excavated from the creek bed 2 miles downstream of the dam by a Northwest 5/8-yard shovel. The final shaping of the fill was done by an Allis-Chalmers motor grader.

In conjunction with the work on the dam, State Route 7-B was also relocated from its alignment paralleling the creek to a point higher up on the hills back from the left bank. About one mile of new road was constructed for this purpose. Traffic was diverted over the new highway after it was completed.

First-Stage Cofferdam

With both the stream diverted and the auto traffic re-routed out of the valley, the way was cleared for construction of the first-stage cofferdam. This was built out from the left bank and enclosed half of the concrete portion of the dam and stilling basin. Cellular steel sheet-pile cofferdams, filled with dirt, made an effective barrier against the stream. By April the contractor planned to have the site ready and his concrete plant in order so that concrete work could begin.

This first concrete work includes monoliths 10 to 13 of the spillway section, monoliths 14 to 20 of the left-bank non-overflow section, and monoliths 1 to 5 on the right bank. Monolith 10 will be built to elevation 1,130; 11 through 13 to elevation 1,123; and from 14 through 20 to a minimum elevation of 1,140. Then the cofferdam will be removed and Ouleout Creek will be diverted back to the spillway section so that the water will pass through the two outlet conduits in monoliths 11 and 12, or even over them, if that is necessary.

The second-stage cofferdam will be built during the summer, and the remainder of the concrete dam will be completed next season. This work includes the rest of the stilling basin, together with monoliths 1 through 9. Monoliths 1 through 6 in the right non-overflow section will be built right up to grade as the work progresses. The monoliths in the spillway section will be kept about 15 feet lower than the rest of the dam as it is constructed, in order to restrain and restrict the flow of the creek until the finish.

After completion, the reservoir will normally be dry, except for a low conservation pool at elevation 1,115, the invert of the conduit intake. The conduit gates will usually be kept open to pass the ordinary flow of the creek, until excess run-off occurs, when outflows will be regulated by gate operation. The spillway crest will be at elevation 1,203; this level would form a pool about 7 miles long. It would require 6 inches of run-off to fill the reservoir to spillway crest.

(Concluded on next page)

The New SEAMAN MIXER

7 Machines in 1

Here they are:



SEE IT AT THE ROAD SHOW . . .

When you buy equipment to mix for highway stabilization, get a machine that not only does that job to profitable perfection, but gives you PLUS uses the year around . . . That machine, and only that machine, is the SEAMAN MIXER.

With the SEAMAN you get not only "plant mix quality at road mix cost" — but 7 other major uses. Here they are:

- Pulverization and Mixing of Soils with all types of binders.
- Aeration of aggregates and certain bituminous mixes.
- Soil pulverization prior to earth compaction.
- Brush, weed and root removal in land clearing.
- Tillage for perfect seed-beds in parks and landscape work.
- Mulching after grass seeding on shoulders and back slopes.
- Fragmentation of ice on pavements to facilitate removal.

And in addition there are 4 more applications — any one of which may be a major use for the contractor or the highway authority: Great economy in maintenance and repair of bituminous pavements, — stock pile mixing at as much as 40% savings, — restoration and leveling of rough turf airfields, — and next-to-slab shoulder stabilization.

See the New Seaman at the Road Show, — Space 3816. The New Seaman is equipped with auxiliary spray bar and pump, scarifier attachment, and variable speed transmission to fit the Mixer perfectly to every job.



Here's that useful practical handbook, "Soil Stabilization Methods". Your copy awaits your request. Ask for Bulletin E-25 or call for it at Space 3816, — the 1948 Road Show.

SEAMAN MOTORS, INC.
MILWAUKEE 3, WISCONSIN

Pulverization and Mixing of Soils with all types of binders.

1

Aeration of aggregates and certain bituminous mixes.

2

Soil pulverization prior to earth compaction.

3

Brush, weed and root removal in land clearing.

4

Tillage for perfect seed-beds in parks and landscape work.

5

Mulching after grass seeding on shoulders and back slopes.

6

Fragmentation of ice on pavements to facilitate removal.

7

Earth-Concrete Dam Will Control Floods

(Continued from preceding page)

Maintenance Shop

For the maintenance and repair of equipment, the contractor erected a 35 x 75-foot wooden shop on the left bank of the creek, and downstream from the dam site. Five wooden doors in one of the long sides facing the road give access to the interior. Windows in the other three sides augment the electric lights hanging from the roof beams. Down the center of the long shop are four 8 x 8 wooden columns supporting a 12-inch steel I-beam. At one end of the building a cross I-beam at roof level sustains a Yale 3-ton overhead chain hoist.

Across the rear wall is a 3-foot-wide wooden workbench where small parts may be repaired or serviced. It is stocked with small tools including bench vises and grinders. Structural repairs are made with a Hobart electric welder.

On the opposite side of the road from the shop are three fuel tanks placed halfway up on the sidehill. Each tank holds 2,000 gallons, and they are filled with either Esso diesel fuel or gasoline from a distributor truck parked on top of the hill. From the lower level the contractor's 2,000-gallon Autocar tank truck gets filled, also by gravity, and then services the equipment out on the job. This is usually done during the noon-day lunch period.

Quantities and Personnel

The major items in the flood-control project include the following:

Stripping	19,600 cu. yds.
Excavation, common	151,000 cu. yds.
Excavation, borrow	75,000 cu. yds.
Excavation, rock	124,000 cu. yds.
Earth embankment	144,000 cu. yds.
Rock fill	97,100 cu. yds.
Concrete	156,800 cu. yds.
Steel reinforcement	442,000 lbs.
Drilling 2-inch grout holes	9,750 lin. ft.
Pressure grouting	6,000 cu. ft.

During the first construction season the Savin Construction Corp. employed a force of 60 to 70 men under the direction of B. A. Wilder, Superintendent. The field staff of the Corps of Engineers included Arthur W. Bartlett, Resident Engineer; William Mager, Assistant Resident Engineer; and Joseph Goldbloom, Chief of Surveys.

The project is under the supervision of the Baltimore District, Corps of Engineers, which is headed by Colonel W. W. Wanamaker, District Engineer.

Soil Stabilization With Calcium Chloride

Soil-aggregate roads are those consisting in whole or in part of a substantial layer of a proportioned, blended, and compacted mixture of soil and aggregate. One of the stabilizing agents used in the construction and maintenance of this type of surface or base course, is calcium chloride.

To bring builders of this type of road a comprehensive report on the use of calcium chloride, the American Road Builders' Association has made available in booklet form the report of its Committee on Calcium Chloride Soil Stabilization.

Technical Bulletin No. 127, 1948, discusses this type of surface, the way it



C. & E. M. Photo

The first construction season for the East Sidney Dam found these men on the job: Joseph Goldbloom, left, Chief of Surveys for the Corps of Engineers; next to him, Resident Engineer Arthur W. Bartlett. Then Superintendent B. A. Wilder and William Mager, Assistant Resident Engineer.

is constructed, and the tests for its strength. It explains sieve analysis, plasticity and compaction tests, materials, tolerances, design, combining of

materials, maintenance, mixing, blading, etc.

Copies may be obtained by writing to the Association at 1319 F St., N. W.,

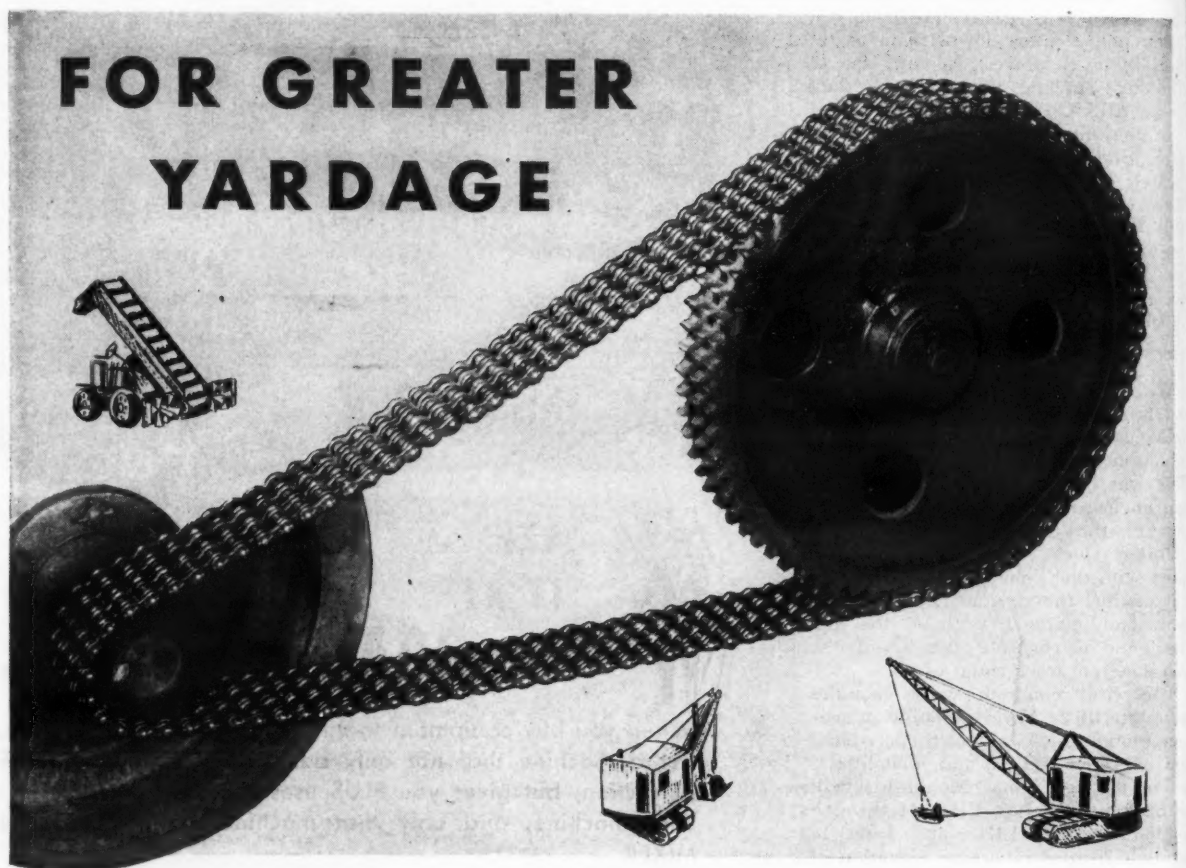
Washington 4, D. C. The booklet is sent free to members.

Movers for Freight Cars

A line of freight-car movers is described in a 4-page folder issued by the Appleton-Atlas Car Mover Corp., 1421 S. 2nd St., Milwaukee 4, Wis. This folder points out the features of the Atlas manual mover and provides a description of the spurs for gripping the track, the replaceable handles, and the compound leverage action designed to provide an effective forward motion to the track wheel.

The folder describes each part in detail and shows its relationship to the action of the mover. It lists the sizes and styles in which the movers are made and the recommended uses for each. Also described is the Atlas self-adjusting car wrench for opening hopper-bottom railroad cars.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 84.



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Hard-Facing Method Tried on Mixer Blades

Manganese Beads Protect Blades Of Concrete Mixer Against Wear: Seven Designs Experimented With To Find the One Most Satisfactory

A METHOD for hard-facing concrete-mixer blades has been tried out and found satisfactory by an engineer for a mixing plant in Menominee, Mich. The method he used was described in a paper submitted to the 1947 James F. Lincoln Arc Welding Foundation Design for Progress Program. L. J. Johnson is the author and the one who developed the method. He is Construction Engineer and Sales Manager for the Limestone Products Co., 320 Sheridan Road, Menominee.

The company's central plant is a revolving-drum mixer with a capacity of 2 cubic yards. It is 88 inches in diameter and 78 inches long. There are two sets of agitating blades—seven to a set—bolted to the inside periphery of the drum with L-shaped brackets. One set consists of short, straight blades 27 x 7 x 3/8 inch. Blades in the other set are made from 3/8-inch plate, and are 64 inches long when projected on a flat surface. They vary in width but average 19 inches. This set is bent into a crescent or bucket shape and serves to agitate and elevate the concrete to the top of the drum. Its blades are subjected to severe abrasive action.

During the war years, the Limestone Products Co. could not get manganese-steel blades for replacements, and it became urgent to find a substitute. As these blades are subject to severe abrasive action from sliding concrete, anything less than a hard alloy steel was considered uneconomical to install. Mr. Johnson first tried using a blade from a 3/8-inch carbon-steel plate, cut to size and then bent to shape in a 5-ton shop press. He found that blades so made would function satisfactorily, but that they had no resistance to abrasion. So a means had to be found for hard-facing these blades with a manganese coat.

Preliminary Analysis

The surface area of one side of the blade is 8 square feet, so complete surfacing would be too expensive and too time-consuming. To figure out an economical solution, Mr. Johnson made a study of the mixer action, paying particular attention to (1) the sections of the blade that appeared to receive the most wear, (2) the direction of flow of the material over the blade—whether transverse, parallel, or diagonal to the axis of the blade—and (3) the speed of flow of material over the various sections of the blade.

From his analysis, Mr. Johnson concluded that a solid, hardened surface was not necessary to provide protection. He figured that manganese beads laid from 1/2 to 1 inch apart and transverse to the flow of the material would provide the desired result. At this spacing, the abrasive action would bridge the softer carbon-steel body plate, and the wear would be taken up by the hardened bead or ridge. In attempting to find the most practical application of the bead, he tried seven designs, using a 5/32-inch Lincoln No. 100 Hardweld rod. It was decided that if this proved satisfactory, it would be replaced in later work by a true manganese rod. Costs and other features of the various designs are described by Mr. Johnson so that their advantages and disadvantages can be compared.

Experimental Designs, Costs

The first design, already described, consisted merely of the blade bent to shape and provided with no facing. It was found that the good scouring action, was easy

to keep clean, was subject to heavy abrasion, and had a life of 2,600 cubic yards. Cost of the blade plate was \$14.00. (This cost for the blade applies

also to all the other designs.)

In the second design, the plate was given a solid application of hard-facing approximately 1/8 inch thick. It had a

very good scouring action, was easy to keep clean, and had a life of 10,500 yards. Cost of the welding materials (Concluded on next page)

HERE IS GAR-BRO'S MONEY-SAVING Power-Cart



Note the large front wheel where the bulk of the load is carried. Dumping is easy because load is balanced in the tray. Hauls all construction materials. Loads directly from mixer. Specifications: 81 1/2" long; 39 1/2" wide. Maximum load: 1500 lbs., 9 cubic feet of concrete . . . Bulletin #77 tells the full story . . . shows the Power-Cart in use. Write for it, or contact Gar-Bro distributors.

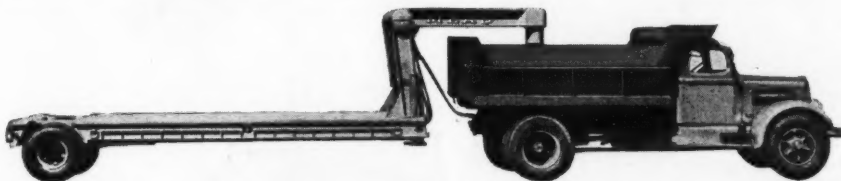
The facts and figures prove that this new Gar-Bro product helps cut construction job costs and builds up real profits. Designed to carry as much concrete as three ordinary wheelbarrows or two carts, it relieves "concrete men" for less back-breaking jobs. It's simple to operate as the steering and transmission are controlled by one lever—a tiller. Forward and reverse speed is foot-throttle controlled. Power unit is detachable from cart. Tractor-type seat reduces operator fatigue.

Designed in accordance with proven engineering principles, the Power-Cart is designed to LAST. GAR-BRO Mfg. Co., 2416 E. 16th Street, Los Angeles 21, California.

Power-cart
(PAT. PEND.)

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WARREN, PENNA.**



Hard-Facing Method Tried on Mixer Blades

(Continued from preceding page)

was \$12.00; of the welding labor, \$22.00. This made a total cost, including the blade plate, of \$48.00.

For the third design, the beads were placed one inch apart and parallel to the length of the blade. A blade of this design had a good scouring action, but there was an excessive abrasive action on the plate where the beads were parallel to the flow. There was also a slight scouring and some build-up of cement deposit on transverse flow. Life of the blade was 4,400 yards. It cost a total of \$24.00—\$7.00 for welding labor and \$3.00 for welding material.

The fourth design had 1/8-inch-high beads, laid 1/2 inch apart and parallel to the length of the blade. It gave a fair scouring and slight abrasive action on the plate parallel to the flow. It gave a poor scouring and heavy build-up of cement deposit on transverse flow. Life of the blade was 5,200 cubic yards, at a total cost of \$32.00—\$13.00 for labor, \$5.00 for materials, and the usual \$14.00 for the plate.

In the fifth design the 1/8-inch-high beads were laid 3/4 inch apart and parallel to the flow of material. There was a good scouring but excessive abrasive action on the plate. Life of the blade was 4,800 yards, at a cost of \$29.00—\$11.00 for labor, and \$4.00 for welding materials.

In the sixth design the beads were placed 3/4 inch apart, but transverse to the direction of flow of materials. This design showed poor scouring action, slight plate wear, and excessive build-up of cement deposits. It had a life of 7,600 yards at a cost of \$29.00—\$11.00 for labor and \$4.00 for materials. Mr. Johnson considered this the least satisfactory of all the designs tested.

The most satisfactory design was the seventh. In this case, the 1/8-inch beads were laid 3/4 inch apart, and at a 45-degree angle to the direction of flow of materials. It showed good scouring action, slight plate wear, and the bead wore down uniformly over most of the blade surface. It had a life of 7,200 yards at a total cost of \$29.00—\$14.00 for the plate, \$11.00 for labor, and \$4.00 for materials.

Conclusions

In summarizing the results, Mr. John-

son balanced against each other the factors of total cost, durability or life, and degree of scouring and material build-up on the blades. And he concluded: "When we consider that the manufacturer's blade costs \$64.00, and has a life of 12,000 cubic yards of mixed concrete, all the test blades compare favorably". All factors considered, he found that the design used for the seventh style gave the most satisfactory results, and he said, "The evidence is so gratifying that henceforth we will prepare our own blades and use this design, with only slight modifications as future experience may indicate".

Hewitt Div. Names Mackett

Charles W. Mackett has been appointed to the newly established position of Manager of Sales Operations for the Hewitt Rubber Division of Hewitt-Robins, Inc. Mackett formerly was Assistant Sales Manager of the Division. In his new post he will direct all home-office sales.

Data on Gasoline Engines

A 4-page folder describing its Models TE and TF 2-cylinder gasoline engines is now available from the Wisconsin Motor Corp., 1910 S. 53rd St., Milwaukee 14, Wis. These engines are rated at from 7.2 to 11.2 and from 8.6 to 13.3 hp. Speed of rotation can be varied from 1,400 to 2,600 rpm on both engines.

This folder discusses the features and

specifications of both models, and points out the principal features of construction. An engineering drawing gives the engine's dimensions, and a power curve and horsepower-listing curve show maximum dynamometer horsepower. Specifications are included for both standard and optional equipment.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 55.

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Time Limit Crowds Airport Paving Job

Probable Flood Threat And Rail Strike Force Concrete Crew to Hurry In Paving New Runways

THE threat of probable floodwaters, coupled with the real possibility of a railroad tie-up of cement shipments, spurred the concrete-paving crews of Fred Weber Contractor, Inc., of St. Louis to great effort to finish the Jefferson City, Mo., Municipal Airport. The project is located in the Missouri River bottomlands on the left bank of the stream across from the Missouri state capital.

Weber's \$250,000 contract with the City of Jefferson completed only the first stage of what will ultimately be a big airport. Funds for this contract were provided on a 50-50 matching basis by Jefferson City and the Civil Aeronautics Administration. Black & Veatch, consulting engineers of Kansas City, supervised the design and administration of the work.

Jefferson City, for many years an important state capital without access from the air, decided to go ahead with at least the first stages of the airport. Present paving will be unprotected from the periodic rampages of the Missouri River until such time as the Pick Plan levees are built by the U. S. Corps of Engineers. In June of 1947, the present airport site lay under 5 feet of water. With flood time drawing nearer and nearer, and a railroad strike threatened, Fred Weber's men hurried to finish the paving.

Airport Design

Ultimately the Jefferson City airport will have a main northwest-southeast runway 100 x 4,200 feet long. Under the Weber contract a 2,500-foot strip of this runway 75 feet wide was built, with an apron and connecting taxiway. In the meantime, the graded area for the balance will be seeded by Jefferson City forces to start a stand of turf, leaving the remainder for later work.

Also included in the ultimate plan is an east-west runway 100 x 3,850, a north-south runway 100 x 2,760 feet, and connecting taxiways and aprons. The triangular area inclosed by the runways is graded to a maximum slope of 1½ per cent to facilitate drainage. The Fred Weber job contained some 163,000 cubic yards of grading. This work shaped the ultimate runway plan, and will be seeded later.

Fred Weber's contract also included 3,260 cubic yards of aggregate base-course material 4 inches thick under the pavement, 19,306 square yards of 7-inch portland-cement concrete paving in the northwest-southeast runway, and 9,566 square yards of portland-cement paving 8 inches thick. This thickened pavement was placed for the plane parking apron, taxiways, and the first 250 feet of the 2,500-foot runway.

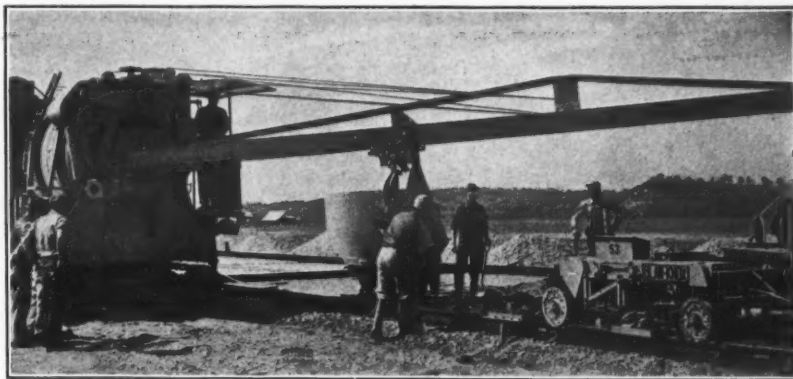
The runway was poured in three 25-foot lanes, and the center lane was

laid first. The parking apron was laid in 20-foot strips by methods to be detailed later.

The new pavement has expansion joints on 120-foot centers, contraction joints on 20-foot centers, and a weakened-plane longitudinal joint down the center of each paving lane.

Earth Work

The job began officially on October 10, 1947, when Weber moved a fleet of earth-moving equipment in to start the grading operation. Five Caterpillar D8's, two with LeTourneau Carryalls and three with LaPlant-Choate scrapers, were used. Three Caterpillar DW10's with Caterpillar scrapers made an appearance, along with a Super C Tournapull used on some of the longer hauls



Massie-Missouri Resources Div. Photo

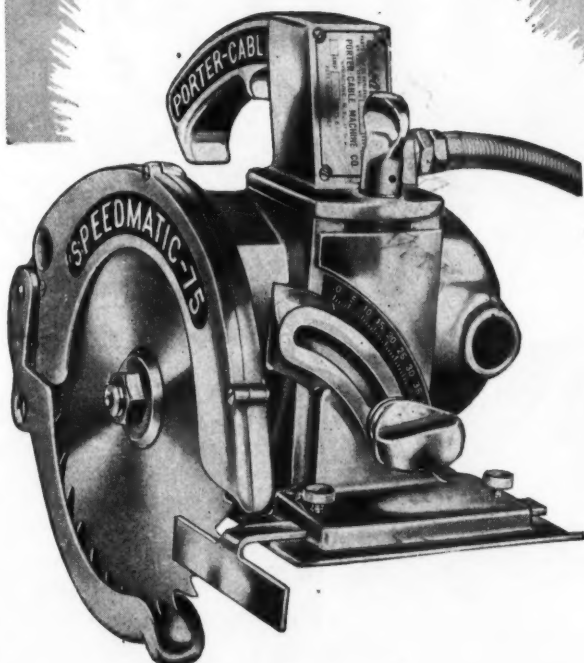
Fred Weber's paving line-up on the Jefferson City Airport job included this Koehring Twinbatch 34-E paver and Blaw-Knox dual-screed finishing machine.

Two D8 Caterpillar tractors were used as pushers in the borrow pit. Two sets of sheepfoot rollers, behind Caterpillar D7 and Allis-Chalmers HD-14C tractors, were used to obtain the 90 and 95 per cent density requirements demanded on the job. Densities of 95 per cent were specified under paved areas.

Average hauls on the job were 1,100 feet, and dirt work went forward on a 10-hour per day basis. The 163,000-cubic-yard job was moved in 38 working days, but because of bad rainy autumn weather, it took four months to get the 38 working days.

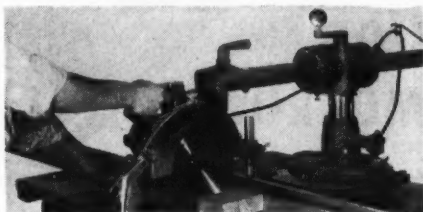
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NO TIPPING!

SPEEDMATIC'S broad shoe permits steady rest. Prevents cramping. One hand holds it straight and true.

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16x24	32.40	38.33	45.60	49.44

Freight paid on orders of six or more.

Other sizes available at corresponding prices.

L. K. LIPPERT COMPANY

297 High St., Columbus 15, Ohio



Time Limit Crowds Airport Paving Job

(Continued from preceding page)

Soils under the airport are sands, silts, and clays. Some are down the list in the A6 and A7 classifications.

Because of the peculiar segregated condition of these soils in the Missouri River bottomland, it was desirable to mix and blend the sand and clay-gumbo as much as possible. This was done successfully with the earth-moving equipment. The soil was mixed in loading. In dumping, the loads of clay were laid out across layers of sand. Two motor graders were assigned to the fill—an Adams 502 and a Caterpillar No. 12—and they too did a good mixing job while they bladed the lifts level prior to rolling.

Ordinarily the moisture content of the borrow pits was so close to the optimum of 21.1 per cent that no further sprinkling was necessary. When the sheepfoot rollers made the first passes on the lifts, the tamping feet mixed the material still further as they compacted. Compaction tests showed that excellent bearing values were obtained underneath the pavement.

Aggregate Base Course

Crushed limestone rock for the aggregate base course was produced by Barnett's Quarry, operated by Cole County Industries, about 6 miles from the job on Highway 63. Weber's fleet of 8 International, Ford, and Mack trucks hauled this material in, dumped it in the center of the runway subgrade in the amounts required, and spread it prior to compaction with the aid of one of the motor graders. The rock was laid in 25-foot strips until total coverage under the runway was achieved.

The entire 4-inch lift of crushed base went in at one time. After the motor grader smoothed it up, one of two 2,000-gallon sprinkler trailers applied water. Compaction of this sub-base was then handled by a Bros pneumatic-tire Wobble Wheel roller, pulled by an International ID-9 tractor. One 8-hour shift per day produced about 2,000 linear feet of 25-foot strip.

Preparations to Pave

Preparations ahead of paving con-

sisted of fine-grading, excavating a form trench, form setting, and the fabrication of dowel steel and joint material under the various pavement joints.

Before any fine-grading was attempted, one of the Carryalls brought in an occasional load of sand, and dumped it along the subgrade in small piles, not more than about 4 cubic yards per

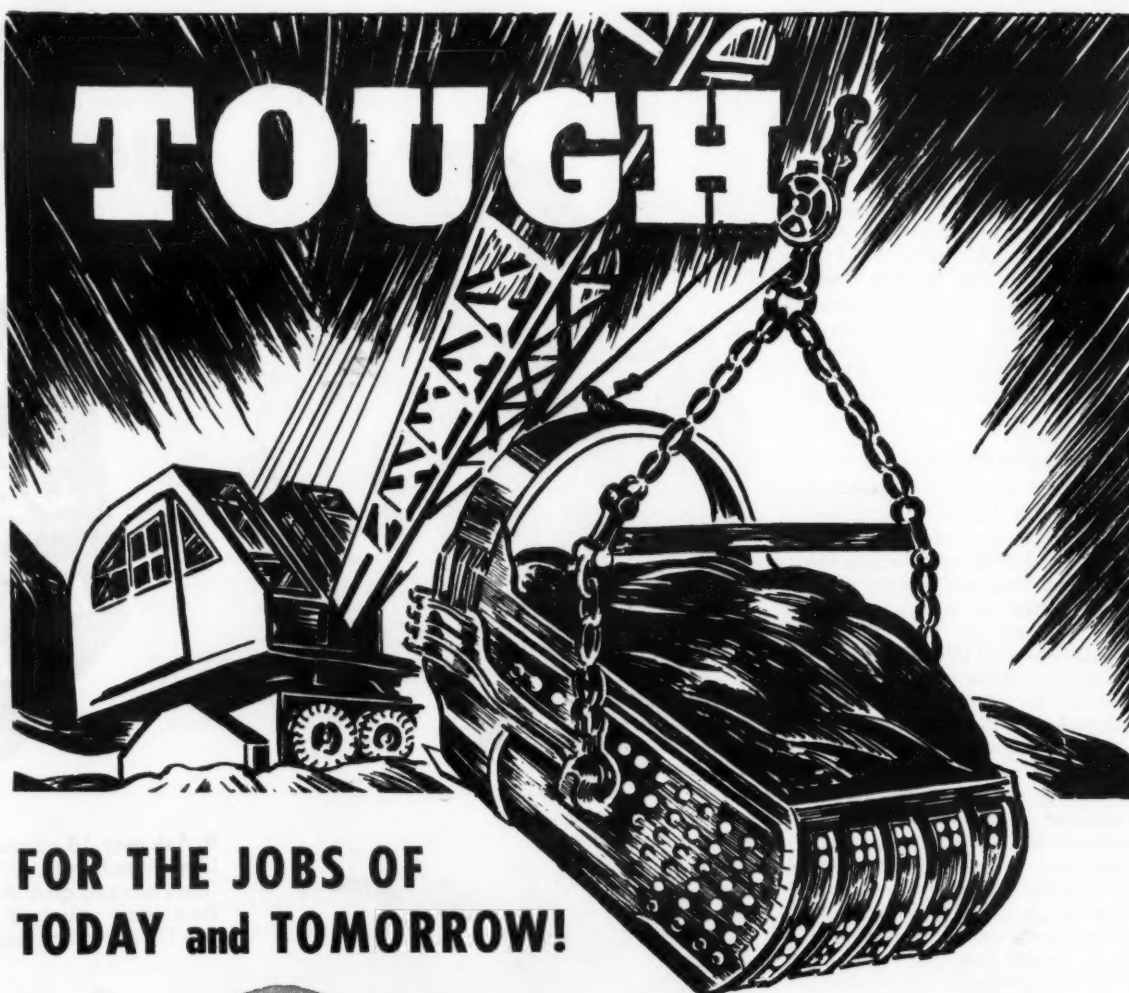
The Adams 502 motor grader at left is dressing flexible-base material adjoining a paved strip on the Jefferson City Airport. At right, men shovel sand to level off the bottom of the form trench. The sand was brought in by a scraper and dumped along the subgrade in small piles, about 4 cubic yards to a station.

station. A Cleveland Formgrader then moved in and excavated the form trenches for the first lane.

Sand from this dumped supply was then shoveled in lightly to level off the bottom of the form trench, and a

7-man form-setting crew came in to set and stake the Blaw-Knox 8x8 steel road forms. About 5,000 linear feet of these forms were available on the job. They were set true to a string

(Continued on next page)



HENDRIX Lightweight DRAGLINE BUCKETS

- ★ 20% to 40% lighter than other buckets, type for type.
- ★ All welded construction for greater strength and durability.
- ★ 12% Manganese Steel chains, fittings, and reversible tooth points.
- ★ Full Pay Load every trip; even in wet digging.
- ★ Perfect Balance; handles easier, fills faster, dumps cleaner.
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Massie-Missouri Resources Div. Photos

The photo at left shows 25-foot strips on the Jefferson City Airport job prepared ahead of the paver—with dowel steel and lane keys in place. Above is a view of the paving line-up from the rear. Notice the water-tank trailers spotted around the paver.

line, and staked down. One man with an orchard-type spray oiled the sides to keep the concrete from sticking, after the fine-grading had been done.

A Cleveland subgrader, wheel-mounted and riding on the steel forms, then moved up to scrape the crushed-rock sub-base off to grade. This had previously been built to within $\frac{3}{4}$ inch of grade, so not too much excess material came up ahead of the blade. As this machine moved ahead, it picked up the sand which had been scattered out by the Carryall. This permitted fines to sift through and fill any low spots which showed up.

Excess material at the ends of rows was removed by a small Allis-Chalmers HD-5 with a front-end loader, dumped to a dump truck, and hauled over to the next lane. A Cleveland subgrade template then moved through, and automatically left the subgrade true to elevation. A small Jaeger form tamper filled in any spots underneath the forms which appeared to be in need of tamping.

With the forms set and the subgrade prepared, the crew then installed the various steel dowels and joint material in expansion joints. These expansion joints consisted of two 10-foot and a 5-foot length of $\frac{3}{4}$ -inch premolded asphaltic mastic filler, with 1-inch round steel dowel bars 18 inches long punched through the material and so centered as to be midway in the finished pavement slab. The dowel bars were greased and one end was capped with a tin sleeve.

The expansion-joint assemblies were made up on a jig in the company yard, and hauled out to the job. Cradled in steel chairs, this joint rested solidly on the subgrade, with steel pins holding it against any movement. A slotted cap, also pinned down, prevented any movement of the expansion-joint material during the concrete pour. The cap and pins were then removed after the concrete was in place. The top of the expansion-joint material was set about $\frac{3}{4}$ inch below the top of the pavement, and poured with joint-sealing compound after the slabs were finished.

Dowel bars under the contraction joints were also cradled in steel chairs, and were $\frac{7}{8}$ by 12 inches, set on 12-inch centers in the 8-inch pavement. In 7-inch pavement, they were placed on 15-inch centers. Dowel bars along the weakened-plane longitudinal center

joints were $\frac{5}{8}$ x 24, set on 30-inch centers.

A formed key, made with heavy tin material, was set and pinned along the

side of both steel forms, to key the two outer lanes into the first center lane that was poured. Dowel bars along this joint were $\frac{5}{8}$ x 24, spaced on 30-inch

centers. The inner end of the dowel was set on a steel chair, while the other end was not extended through
(Continued on next page)



"STARS OF THE SHOW"

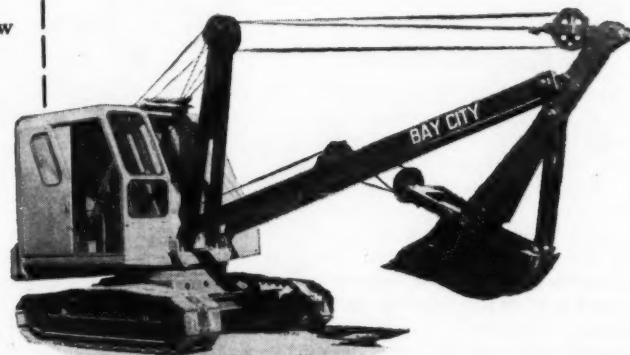
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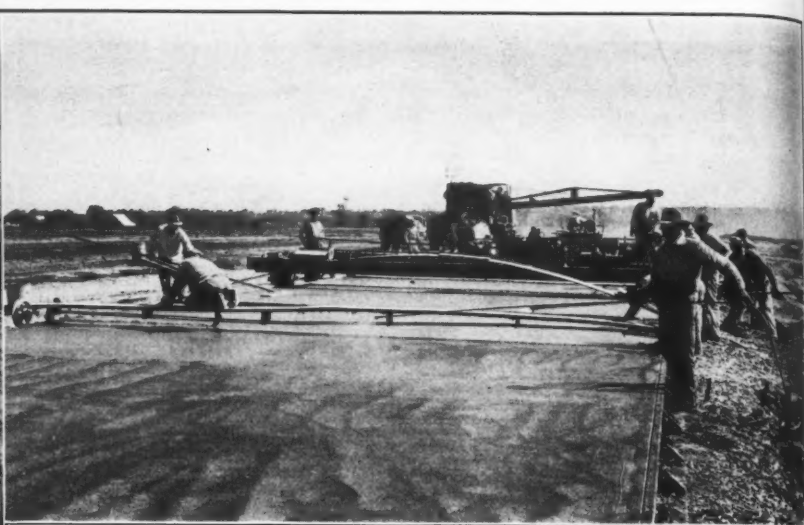
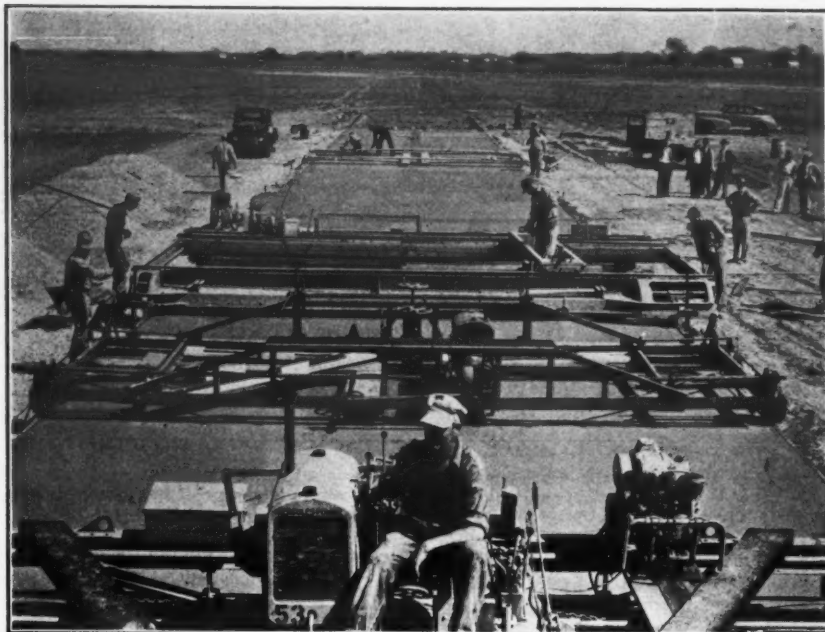
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Massie-Missouri Resources Div. and C. & E. M. Photos

Here are two views, from fore and aft, of paving operations on the new Jefferson City Municipal Airport. At left, from the top of the Twinbatch 34-E paver, you can see the Blaw-Knox finisher operator, the Flex-Plane joint cutter, the Koehring Longitudinal Finisher, and hand work in the background. Above, from the finishing end, you can see the Hunt Process curing compound being applied.

Time Limit Crowds Airport Paving Job

(Continued from preceding page)

the form. It was simply bent out of the way inside the key form. This tin form remained in place after the Blaw-Knox forms were stripped, and the end of the dowel bar was straightened out at that time to catch the next lane.

Batch Plant Erected

Concrete materials for the job came from Cole County Industries, with Wal-leau Sand Co. supplying sand, and Alpha portland-cement shipped in from St. Louis over the M.K.T. railroad. A Blaw-Knox 150-ton 2-compartment batching bin was shipped in and erected close by the railroad siding. The rock aggregates for this plant, however, were trucked in from the near-by commercial aggregate producer.

An efficient system of stacking aggregate was used. The trucks dumped their loads, and a D7-mounted bulldozer stacked the material about 12 feet high and shaped a flat place on top of the pile. A truck road was then formed and pressed in by repeated passes of the tractor. After this had been done, the trucks drove to the top of the pile and dumped their loads down the sides, where the aggregate could be picked up by the Lorain 40 Moto-Crane which charged the big bins.

A Heltzel 300-barrel bulk bin was also erected along the M.K.T. railroad spur, with a screw feed conveyor under the railroad track to transfer the bulk cement from hopper-bottom cars.

Batches were sent out according to the following designed weights, based on a 34-cubic-foot batch:

Cement	687 lbs.
Sand	1,419 lbs.
Aggregate (2 1/2 to 3/4-inch)	2,715 lbs.

This batch was also designed for a total water content of 351 pounds, and the ratio of the mix was 5.8 sack per cubic yard, 5.75 gallons of water per sack.

Five batch trucks, each hauling two batches, were used. In weighing the material out, the Blaw-Knox plant

(Concluded on next page)



Quickly adjusted for toe-hole drilling

Because of the flexibility of its mounting the G-200R Wagon Drill can be quickly adjusted for toe-hole drilling or bench drilling. For line drilling, or drilling close to the face, the carriage wheels can be turned at right angles.

The main frame, uprights and mounting, are of seamless steel tubing, providing maximum strength per pound of weight. The sliding

cone, with a 36-inch adjustment, offsets ground irregularities or uneven steel lengths. With roller-bearing wheels and 6.00 x 16 pneumatic tires, it can be moved with ease and speed over rough ground.

The G-200R Wagon Drill is available with CP-50N (3"), CP-60N (3 1/2") or CP-70 (4") Drifters. Write for complete data.

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C. & E. M. Photo
Left to right are Assistant Resident Engineer David A. Brown and General Superintendent Fred Weber, Jr., on the \$250,000 Jefferson City Airport job.

in place on each alternate lane, and the side form keyways installed. Because of the restricted working space on the short lanes, the surface of this concrete was vibrated with a long surface-type vibrator, powered by a Briggs & Stratton engine, and the surface was finished with steel straight-edges and other hand tools.

Next morning early, when the crew arrived for work, the steel pins were pulled by a Cleveland pin puller, the forms were stripped, and the other lanes were filled in.

Final dressing of the entire dirt area was done by an Eversman land leveler.

Personnel

Fred Weber, Jr., was the General Superintendent on the job, in charge of field work, with Roy Nyfeler as his Paving Foreman.

Raymond Cote was the Resident Engineer for Black & Veatch, with David A. Brown as his assistant in charge of all field inspections and testing.

prepared both batches before the truck drove in under the bins. Both batches were dropped in the truck simultaneously. The truck then moved in under the cement plant to take on its cement content one batch at a time.

Paving-Machine Line-Up

Down on the airport, an impressive list of modern concrete-paving equipment appeared. In the order of their work on the concrete, this line-up included, first, a Koehring Twinbatch 34-E paver, then a Blaw-Knox dual-screed finishing machine, a Flex-Plane joint-cutting machine, a Koehring Longitudinal Finisher, hand finishers with steel straight-edges and a belt, and the curing bridge.

Placing and Finishing Concrete

The big 34-E paver, with its 35-foot boom and dual-gate bucket, was spotted outside the forms, where there would be ready access for the batch trucks and where the travel of the machine would not interfere with dowel bars inside the forms. Mixing water for the paver was hauled by two 2,000-gallon water trailers, pulled by a Ford tandem tractor. The trailers were attached to the paver by 60 feet of flexible rubber hose.

A mixing time of 30 seconds per drum produced concrete with an average slump of 2 inches. The slabs contained no reinforcing steel, so the job was set up without a spreader. By carrying his bucket low—almost at grade line—and spreading the concrete as it was dumped, the paver operator spotted the buckets accurately enough so that only three men were needed to puddle the concrete ahead of the first finishing machine. One of these men also carried concrete back behind the Blaw-Knox finisher, to fill in any low spots at the form lines. Two Jackson vibrators, carried on the stern of the finishing machine, were used along the edges.

Both the Blaw-Knox and the Koehring finisher made at least two passes over the concrete surface. The Flex-Plane machine put in the premolded strips for longitudinal center joints, and the contraction joints were also cut and the mastic material set in the slots.

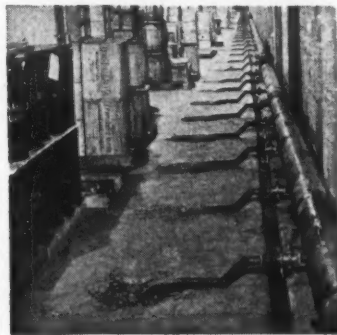
A final pulled-belt finish, made behind the steel straight-edges, left the concrete surface with a herringbone effect. After this finish was pulled, other men dressed the top of the expansion joints and edged the contraction joints. Footage per 8-hour paving day, in the early part of the job, was not up to Weber's usual expectations. The best pour up to the halfway point in the job was 620 feet, made on the day the job was visited for this magazine. On other days previous, 500 feet of 25-foot strip had been a fair average. However, this production was being stepped up.

Parking Apron Poured

In building the concrete parking apron, the area was laid out in 20-foot lanes. The steel forms were then set

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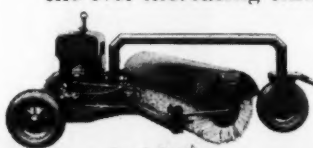
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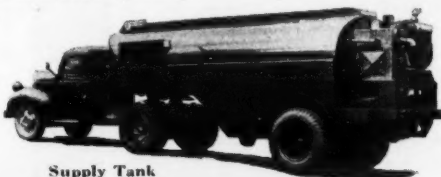


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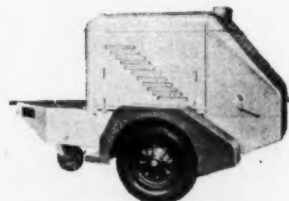
"Spray Master" Pressure Distributors are not just an ordinary spraying unit, but an engineered piece of equipment, designed to give its users efficiency, low cost operation. It stops and starts the spray instantly, circulates by vacuum not pressure, has one valve for operating the spray bar, one Low Pressure Atomizing Burner using low cost fuel. These are only a few of the many advantages of the "Spray Master." For a sturdy unit to build the much needed weather beaten Highways, use a "Spray Master." Write for Bulletin No. 14.



Road Broom



Supply Tank



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CINCINNATI 2, OHIO

Automatic Spray Machine Performs Five Operations

A bulletin describing the operation of its automatic spray machine is being distributed by Flex-Plane of Warren, Ohio. This Flex-Plane machine is designed primarily for use in applying membrane curing materials to concrete surfaces. Among the features described in Bulletin No. J-100 are the double-spray pattern, the single external-mix-type nozzle, and the constantly agitated pressure tank.

Four attachments are available for

use with the machine, and these are described in detail. When placed on the machine base, they can be used to broom, belt, drag burlap, or install permanent traffic lines. The attachments are interchangeable.

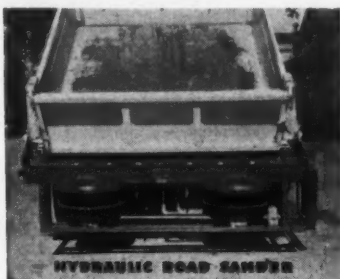
The bulletin illustrates and describes the 2-cylinder 12-hp Hercules gasoline-engine power unit, the track wheels, the general arrangement of the main elements of the spray system, and other component parts of the machine. It also contains several pictures showing the machine in use on various road-construction projects.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 67.

Barkley Named to New Post

Littleton C. Barkley has been appointed General Sales Manager of Asbestos and Rubber Products, West

Coast Division, by Raybestos-Manhattan, Inc. Mr. Barkley will supervise the sales of the Manhattan Rubber, Asbestos Textile & Packing, and the Equipment Sales Divisions of the corporation. Previously, Mr. Barkley was Sales Manager for mechanical rubber products of the Manhattan Rubber Division.



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City, county and state highway departments use Hydro Spreaders because they provide the safe, sure way of spreading icy streets and roads. Easily installed on any dump truck with hydraulic hoist.

Material can be spread from 9 ft. to 35 ft. at speeds up to 30 m.p.h. All sprockets and chains are fully enclosed and material can be dumped over spreader without damage. One man can drive truck and operate spreader from cab.

An exclusive Hydro Spreader feature is the automatic gate opening device. When the driver starts the spreader the gates open and as the spreader is stopped the gates automatically close. There is no waste of material when spreader is not in operation. Hydraulic Spreaders are guaranteed to be free from defects in either materials or workmanship. Immediate delivery.

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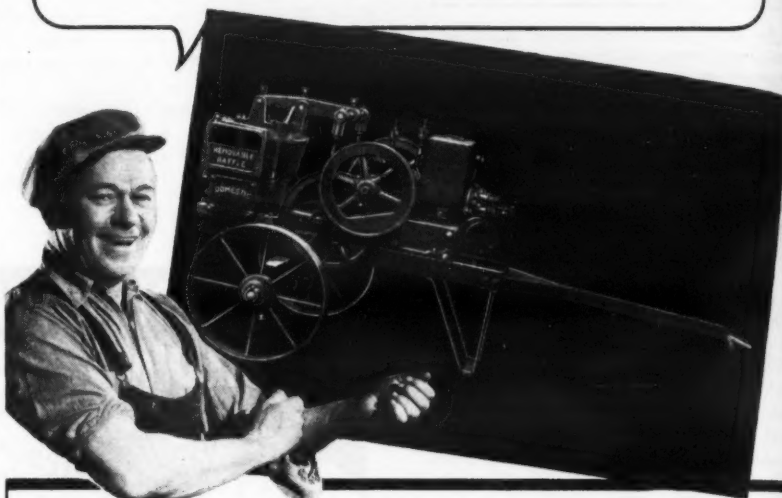
The Rapid-Fire Heater will trail to the job at 40 m.p.h. It will unload asphalt into the distributor or storage tank at 250 GPM. It will heat a 10,000 gallon insulated car 50 degrees or more per hour.



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Buckets for Concrete In Three Capacities

A line of concrete buckets is made by the Wiley Mfg. Co., Mountville, Pa. They come in 18, 33, and 60-cubic-foot capacities, with larger buckets available on special order. Features claimed for the Wiley buckets include ease of control, a single radial gate, mechanical advantage at the opening lever, and two pins as the only moving or wearing parts.

The 18-foot bucket has a shell height of 42 inches, an inside diameter of 39½ inches, a 10 x 16-inch discharge gate, and a weight of 780 pounds. The 33-foot bucket has a shell height of 51 inches, an inside diameter of 46 inches, a 14 x 24-inch discharge gate, and a weight of 1,120 pounds. The 60-foot bucket has a shell height of 62 inches, an inside diameter of 56 inches, a 16 x 32-inch discharge gate, and a weight of 1,900 pounds.

According to the manufacturer, the Wiley bucket will open or close easily, no matter how much concrete remains in it; it will not leak or drip; the gate will cut off cleanly at all times; the bucket can be used as a floor hopper, for loading buggies and wheelbarrows, or discharging into chutes; it can be used for pouring into narrow forms and columns; and it can be rolled from place to place by one man. The power of the hand lever is multiplied twenty times, Wiley explains, when breaking open the gate, due to the toggle action of the lever and linkage; it is reduced to three to one after the gate is partly open.

Other contractors' equipment made by this company includes the Wiley whirleys, stiffleg derricks, hoisting engines, steel barges, pile drivers, derrick boats, steel trusses, etc.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 18.

Road-Mix Equipment

A 16-page catalog on its line of road-building equipment is being distributed by the Wood Mfg. Co., 6900 Tujunga Ave., North Hollywood, Calif. Featured in the bulletin are the Wood Roadmixer and the Wood Preparizer. Also described are the 1,500 and 3,000-gallon portable supply tanks, spreader wagons, and spreader boxes.

The Roadmixer is a one-man operated one-pass mixer. It is designed for use with all types of aggregates and soils, with any type of binder or stabilizing material, for construction of mixed-in-place pavements or base courses. It is made in a self-propelled or a tractor-drawn model.

The Wood Preparizer is designed for use in scarifying and pulverizing old oil mats and macadam roads, and preparing them for re-use in base stabilization or surface courses.

The catalog describes and illustrates each of these machines in detail. It gives their specifications and recommended uses. It also features a descrip-

tion of road-mix construction.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 44.

Text on Pump Operation

A text covering the theory, design, and application of centrifugal, mixed-flow, and axial-flow pumps has been published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. It was written by A. J. Stepanoff, Development Engineer for the Ingersoll-Rand Co. Mr. Stepanoff holds a Ph. D. degree from the University of California.

The book discusses cavitation and model testing; pump operation outside the normal head-capacity and speed range; axial and radial thrust; determination of the true critical speed of pump shafts as modified by the effect of stuffing boxes; control of head-capacity and brake-horsepower curves; and pumping of viscous liquids. Price of the book is \$7.50.

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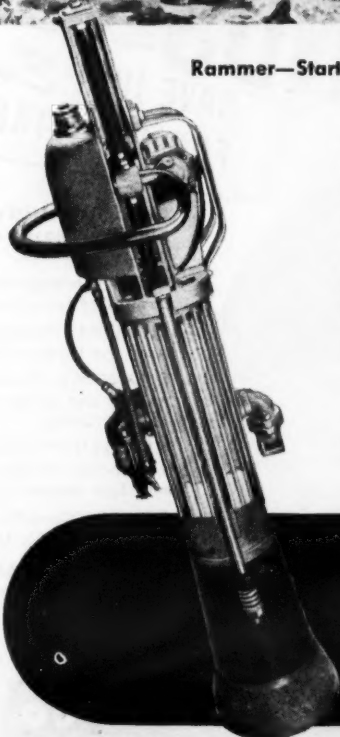
The New BARCO RAMMER



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The new Barco Rammer is faster and more effective than any other type of tamper. It is easier on the worker, enables him to get more work done in less time, and at lower cost. Although rollers may do the compaction on large projects, they cannot reach locations close to abutments, culverts, walls and so on. But the new Barco Rammer remedies this situation, gives specified compaction. On large backfill tamping where a ditcher is used, the Barco Rammer works quickly and effectively. Today, with Federal, State and City authorities, as well as private corporations devoting more and more attention to these problems, the best answer is the Barco Rammer—the entirely new machine with the entirely new method of securing soil compaction. For more information write Barco Manufacturing Company, 1818 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

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Gravel Courses Laid On Secondary Road

Native Material Used for Base and Surface; Latter Is Treated With Tar; New Grades Promote Safety

† THE reconstruction of a 2.6-mile section of State Route 17 between Manchester and Readfield in Kennebec County, Maine, about 5 miles west of Augusta, featured the use of gravel for both base and surface courses. This stretch of secondary highway, with a bituminous-surface-treated pavement only 17 feet wide, was marked by many curves, both horizontal and vertical. Grades as steep as 15 per cent, sight distances as short as 100 feet, together with sharp curves in the alignment, were contributing factors in several accidents that had occurred there.

Accordingly the Maine State Highway Commission selected this piece of highway for reconstruction. Last year it awarded a contract for its improvement to J. R. Cianchette, a contractor from Pittsfield, Maine, on his low bid of \$94,652. Work got under way in August, 1947, and the grading was completed by November. Good progress was also made during the fine late-autumn weather in laying both the gravel base course and the gravel surface course. But winter closed in before this phase of construction was completed. This spring the gravel work was completed, along with the tar surface treatment.

Rock Work

During the grading operations the old alignment was generally followed, but the curves were flattened, and the maximum 15 per cent grade was reduced to 9 per cent. The sharpest curve is now 5 degrees. After the clearing and grubbing was attended to along the slightly widened roadbed, the rock cut at the top of the steep hill was attacked with drill and dynamite. By taking off 12 feet of ledge at this point, the sight distance was lengthened and the grade reduced.

Holes were drilled with a Chicago Pneumatic wagon drill and a half dozen Ingersoll-Rand Jackhammers. Air was supplied by three compressors—a 315-cfm Chicago Pneumatic, and two Ingersoll-Rands, a 315-cfm and a 210-cfm model. In the wagon drill the lengths of steel started at 4 feet, and were increased to 8, 12, and 16 feet, while the bit sizes decreased gradually from 2 3/4 down to 2 inches. With the Jackhammers, drill steel in 2, 4, 6, 8, and 10-foot lengths was used, with the bits starting at 2 3/4 and dropping down to 1 1/2 inch in size. In the hard blue rock a single bit drilled only from 2 to 6 inches before it had to be removed for necessary sharpening.

Spacing of holes varied between 4 1/2 to 6 feet on centers. They were charged with American dynamite, both 40 and 60 per cent strengths. From 50 to 300 holes were shot at a time. Convenient detours were provided for traffic during these construction operations.

The second-deepest rock cut on the job was 8 feet, but most of the remaining rock excavation was in shallow cuts averaging 1 or 2 feet in depth. Drill holes for such excavation were handled by the Jackhammers.

Grading Operations

After blasting, a Bucyrus-Erie 1 1/4-yard shovel dug out the rock while a Lorain 3/4-yard Backdigger excavated for the drainage ditches and culverts. Aside from the rock, the roadway excavation was chiefly a clay-gravel material in which was mixed a goodly number of small boulders. Not enough material was available to complete the

fills, so two borrow pits were opened. One was located about 1,000 feet off the road at the south end of the job, while the other was a similar distance back from the right-of-way, but about 3/4 mile south of the upper end of the contract. The pits were gravel material.

Two Lorain shovels, a 1 1/2 and a 3/4-yard model, worked the pits. All the shovels mentioned were not necessarily on the job at the same time, but were brought in as needed. When they had completed their assignment, they were shifted to other projects. All the earth-moving was done with trucks. The contractor had nine of his own on the job—7 Internationals of 4-yard capacity, and 2 Sterlings of 7-yard capacity. As



C. & E. M. Photo
A Lorain 3/4-yard shovel loads an International 5-ton truck with base-course gravel for State Route 17 in Maine.

needed, he added from 6 to 12 other trucks, averaging 4 yards each, which were hired by the hour.

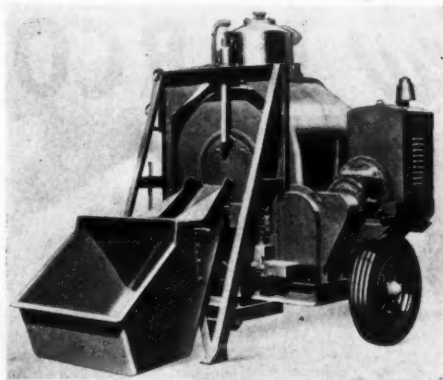
Hauls along the roadway were about 2,500 feet, but from the borrow pits (Continued on next page)

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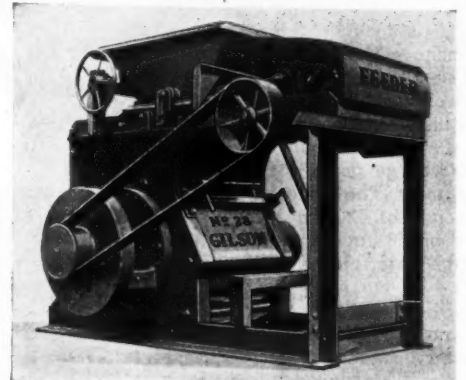
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Above is a general view of the Pioneer gravel screening plant which J. E. Blanchette set up to process surface-course material for his Maine road-construction job. In the background a Lorain Moto-Crane with a $\frac{3}{4}$ -yard bucket excavates the gravel along the face of the pit. At right is another view. One truck dumps pit-run gravel into a hopper and feeder leading to the storage bin, while another truck picks up a load at the bin for hauling to the road.

C. & E. M. Photos



the average haul distance was a mile. The trucks tail-gated the material on the fills. There it was spread in 2-foot lifts by either a Caterpillar D7 tractor-dozzer or an International TD-14 tractor with a Bucyrus-Erie blade. The trucks and tractors furnished sufficient compaction, and a Caterpillar No. 12 motor grader did the final shaping. With this equipment, from 4,000 to 5,000 yards of earth, together with about 1,000 yards of rock, was handled in a 6-day work week of 10-hour days.

The new roadway is 24 feet wide, out-to-out of shoulders, and has a $4\frac{1}{2}$ -inch center crown to the 9-foot point. The bituminous surface treatment is 18 feet, leaving 3-foot shoulders at the sides. Fill slopes and the front slopes in cuts are 3 to 1, while the backslopes in cuts are 2 to 1. Ditches are 1 foot wide, and at the bottom are 2 feet $3\frac{1}{2}$ inches below the center-line grade.

Gravel Base and Top

As soon as some progress had been made on the grading, work also started on placing the gravel base course. The gravel was laid the full width of roadway, and usually 18 inches thick in the fills. Where the subsoil was weak, this depth was increased, in some locations to as much as 30 inches. In cuts the depth varied from 18 to 24 inches. The specifications required that no stone in the gravel be over 8 inches, and that no more than 50 per cent pass the $\frac{1}{4}$ -inch sieve.

Gravel to meet these requirements was available in two pits, one at the south end of the job, and the other about midway; both were only a few hundred feet back from the road. The shovels dug and the trucks hauled the gravel to the road where it was dumped and spread in 9-inch layers by the dozers, and shaped by the grader. Traffic was maintained over the highway during the gravel spreading, and this vehicle movement also aided in the compaction along with the construction equipment.

The base course was next covered with a 2-inch gravel surface course, also the full 24-foot width. For the surface, the maximum size of stone was limited to $1\frac{1}{2}$ inches, and at least 50 per cent had to be over $\frac{1}{4}$ inch in size. The nearest material available approaching these specifications was located in a pit just 8.7 miles from the

north end of the job, which meant that the average haul came to 10 miles. But the gravel first had to be screened to
(Concluded on next page)

Relocating Highway in Massachusetts



Earth-moving equipment on the job as road is pushed through heavily wooded, high level area.

William G. Johnson, resident engineer, Massachusetts Department of Public Works (seated), discusses project with William Sauer, general superintendent.



Flood waters from the Connecticut River have long plagued Route 116, north-south highway connecting Chicopee and South Hadley, Mass. To avoid this condition, the Massachusetts Department of Public Works has moved part of Route 116 to high ground a considerable distance to the east. The road is now called the High Level Route.

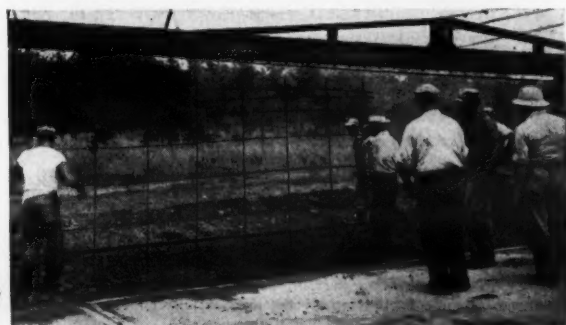
These pictures show construction of the new two- and four-lane, 19,000-ft highway by Daniel O'Connell's Sons, Inc., Holyoke, Mass. Bar mats, dowel units, guard rail posts and bridge reinforcing were supplied by Bethlehem.

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Bethlehem Hinged Bar Mat handled by only two men. With bottom section placed, hinged portion needs but slight push to fall into position.



Workers tamp excess concrete about Bethlehem Hinged Bar Mat as skip prepares new batch. Note bar mat lies flat.



Water truck parks on newly-paved first lane as skip prepares course for second strip.

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Gravel Courses Laid On Secondary Road

(Continued from preceding page)

remove the larger pieces before it was placed as a surface course.

Gravel Screening Plant

A Pioneer gravel screening plant was set up in the pit to sift out the big stones. First the gravel was excavated along the face of the pit by a Lorain ¾-yard Moto-Crane and loaded into two trucks. The trucks backed down a slight earth ramp to end-dump the material into a timber hopper at the bottom of which was a feeder. The feeder moved the gravel along to a 40-foot-long x 2-foot-wide conveyor belt which lifted it to the top of a 21-yard metal storage bin.

As the gravel fell off the belt it dropped onto a 12 x 2½-foot shaker screen with 1¼-inch square openings. The oversize material ran off over the sides, while the rest of the gravel was collected in the bin. The plant was operated by a Le Roi gas engine. Two International KB-8 5-ton trucks sufficed to keep the plant hopper filled with material. An average of 15 other trucks hauled the gravel to the road, driving

under the bin to get loaded. As the fine gravel was dumped it was spread and shaped carefully by the motor grader, and then rolled by a 10-ton 3-wheel Buffalo-Springfield.

Bituminous Surface Treatment

The center 18 feet of roadway was then given a bituminous surface treatment. First a prime of RT-4 tar was applied at the rate of 0.4 gallon to the square yard; it penetrated about ½ inch into the gravel. A light cover of sand was spread over the tar to keep it from picking up, and it was left for from one to several days before the seal coat was put on.

RT-4 tar was also used for the seal, and was applied at the rate of 0.35 gallon to the square yard. The tar was supplied and put on by Koppers, Inc., which shipped a tank car of bitumen to the Maine Central RR siding at Augusta from its plant at Portland, Maine. From there a distributor hauled it 6 miles to the project and applied the tar, half the width at a time, with a 9-foot spray bar.

The tar was at once covered with a fine gravel or sand, graded so that 100 per cent passed the ¾-inch screen and at least 50 per cent was retained on the ¼-inch screen. This material was also

taken from the fine-gravel pit and dumped in small piles along the shoulders. From these piles it was cast over the bitumen by hand shoveling. About 200 cubic yards of material was required for a mile of surface treatment. A light broom drag was pulled over the surface of the road, but no rolling was required.

Quantities and Personnel

The major items on this 2.6-mile secondary road contract included:

Earth excavation	13,000 cu. yds.
Rock excavation	8,000 cu. yds.
Common borrow	12,000 cu. yds.
Gravel base course	20,400 cu. yds.
Gravel surface course	2,200 cu. yds.
Bituminous material	22,000 gals.

Contractor Cianchette employed an average force of 35 to 40 men; Antonio Frederick was his Superintendent.

Frank M. Landers was Resident Engineer for the Maine State Highway Commission, which is headed by Lucius D. Barrows, Chief Engineer. H. Stanley Weymouth is Engineer of Secondary Highways.

Catalog on Truck Mixers

A catalog describing its Hi-Discharge Moto-Mixers has just been issued by the Chain Belt Co., 1666 W. Bruce St., Milwaukee 4, Wis. This 20-page catalog covers all the features of construction, operation, and maintenance of these mixers.

Among the features listed in Bulletin No. 48-8 are: the Hi-Lo visible mixing action; the Rex water nozzle; the 3-point drum suspension; the cushioning chain drum drive; water system with booster pump; twin-clutch transmission; and the Rex discharge system.

Each of these features is illustrated in detail, and text fully describes its purpose and operation. Diagrammatic drawings are used to illustrate the mixing action, internal construction, and other salient points. The booklet also contains a complete list of specifications, dimensions, and capacities.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 79.

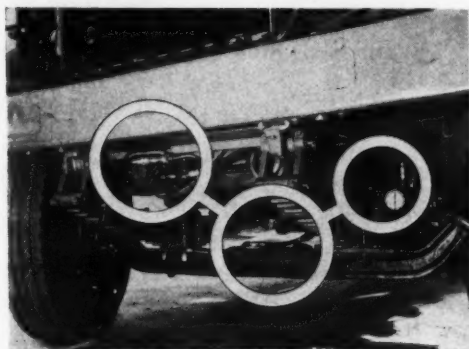
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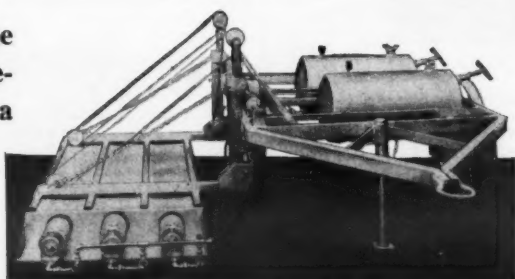
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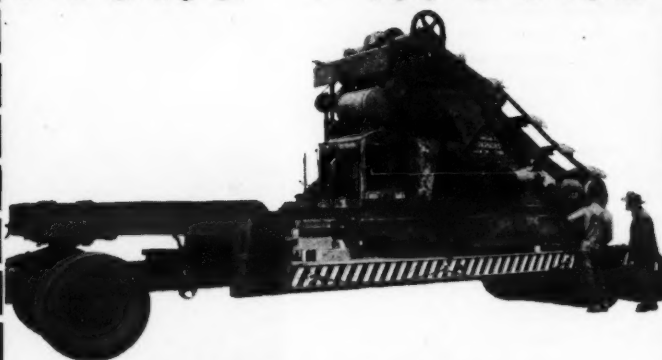
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Heavy 14" x 10" structural steel frame... 2" hardwood planking laid flush with main frame beams; flat gooseneck for additional loading space; all necessary tractor connections; PLUS a choice of body types are other advantages of the W-W 25 "SA" model. This W-W Lowbed is available in a skid-loaded model or with a beavertail and exclusive loading ramps enabling one man to load self propelled equipment.

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Rock Asphalt Tops Two Binder Courses

Plant-Mix Used for Base And Widening on 10-Mile Road Job; Pugmill Turns Out 78 Tons Per Hour

(Photo on page 1)

THE State Highway Commission of Indiana approved a 10-mile section of State Route 28 last year in Madison County, extending from the west city limits of Elwood to the intersection of State Route 9. The betterment was a road-maintenance contract awarded to Wayne Paving, Inc., of Fort Wayne, Ind., on its low bid of \$183,080.93. In general, the job consisted of laying two binder courses of plant-mix over the original pavement, and then a single course of rock asphalt as a wearing surface. Most of the project also included widening.

Located in central Indiana, the contract was stretched out over three different types of highway, so that somewhat different procedures had to be followed in the reconstruction. The western 2 miles of the job goes through the city of Elwood where the three courses of bituminous pavement were laid over concrete varying in width from 34 to 41½ feet between curbs. East of the city came 4 miles of old bituminous pavement which had formerly been widened from 18 to 20 feet with a 1-foot strip of cement-concrete on each side. It averaged 20 feet in width and, under this contract, was widened on the north side to 22 feet 6 inches. The remaining 4 miles at the east end of the project was an 18-foot concrete pavement. This section was now widened 2 feet 3 inches on each side, making a total width of 22½ feet.

All the widening consisted of a 6-inch thickness of plant-mixed bituminous concrete. A slightly finer mix was used for the two 1-inch courses of binder that were laid down the center of the road to a width of 22 feet 6 inches. Each binder course weighed 110 pounds to the square yard. The wearing surface consisted of a single layer of rock asphalt laid in a course ½ inch thick, and at the rate of 60 pounds per square yard. Beyond the city limits the surface is 22 feet in width; within Elwood it covers the binder from curb to curb.

The bituminous concrete for widening and binder was mixed in an asphalt plant set up on a siding of the Nickel Plate Railroad at the western outskirts of Alexandria. The town is on State Route 9 at the eastern end of the job. The 1 1/5-ton pugmill turned out the mix at the rate of 65 batches totaling 78 tons per hour, when it was operating at full production and there were enough trucks to handle the output. Rock asphalt was supplied by the Kentucky Rock Asphalt Co. and was shipped from Rocky Hill, Ky., to the job plant in gondola railroad cars.

Widening operations on the maintenance project got under way the middle of June, 1947, with the work moving westward from the plant. Paving started within a couple of weeks and progressed steadily along to completion in August.

Widening Operations

To make the cut for the widening operations, the contractor used a Buckeye trenching machine on either or both sides of the road, according to the location. The depth of cut was 6 inches, the same thickness as the material to go in the widening. The width, however, was 4 feet; the extra space was needed for the steel road forms employed to give a straight line and clean-cut edge to the road. About 4,500 feet of Heltzel forms were included in the contractor's

equipment for use on the widening.

The plant-mix was laid in the trench in two courses by an Apsco Model 60 spreader, set to the width required. Each course was rolled by a Buffalo-Springfield trench roller. Before any pavement was laid, the original surface was given a prime coat of AE-150 asphalt. This was applied, a lane at a time, in advance of the binder course by an Etnyre 1,250-gallon distributor at the rate of 0.07 gallon to the square yard.

Asphalt Plant

A Hetherington & Berner asphalt plant was set up on a site formerly used for the same purpose, where two track sidings had already been installed. The track at one side of the plant was used



C. & E. M. Photo

An Adnan Black Top Paver lays the second course of binder in a street in Elwood. Two miles of the Wayne paving job went through the city.

for aggregate cars, while the other siding stored the tank cars containing the bitumen. Stone for the mix was fur-

nished by the Erie Stone Co. of Bluffton, Ind., and was shipped 65 miles by (Continued on next page)

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Rock Asphalt Tops Two Binder Courses

(Continued from preceding page)

rail to the Nickel Plate Railroad siding at the plant. The sand was obtained at the Dundee pit of the Western Indiana Gravel Co., which is only 3 miles from the plant, and at Lafayette, Ind., 75 miles away. It was delivered partly by truck and partly by rail.

The aggregate coming by rail was unloaded from the cars by a Lorain crane with a 50-foot boom and an Owen 1 1/4-yard clamshell bucket. The sand and two sizes of stone were either stockpiled or loaded directly into the 3-compartment 35-ton aggregate bin which was the starting point for the flow of material through the plant.

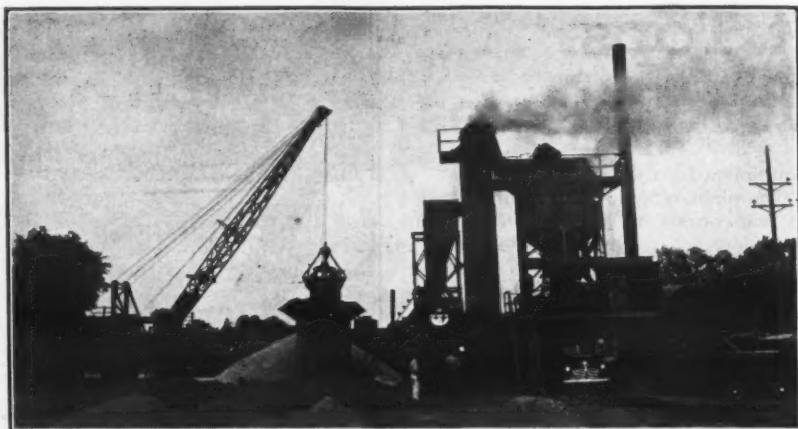
A triple feeder at the bottom of the hopper directed the different sizes of aggregate to the bottom of a 20-foot cold elevator. There it was carried in buckets to a 24-foot-long x 5-foot-diameter drier. Here the material was heated by two Hauck oil-burning torches as it passed through to the 40-foot enclosed hot elevator at the other end. A Sturtevant 4-foot-diameter dust-collecting fan drew off the fines to a dust bin above the drier, but they were fed back into the heated material at the foot of the hot elevator. The smoke, fumes, and gases were discharged through a stack.

From the peak of the hot elevator the aggregate was discharged onto two double-deck screens at the top of the plant tower. The four sizes were then collected below the screens into four bins with a total capacity of 30 tons. From here the material was dumped into weigh buckets equipped with Howe dial scales. The buckets in turn emptied into the 1 1/5-ton pugmill.

Most of the asphalt for the prime coat was purchased from the W. L. Magaw Co. of Richmond, Ind., and Asphalt Material & Construction Co. of Indianapolis, which delivered it to the job as needed in tank trucks. The bitumen for the hot-mix, a 60 to 70-penetration asphalt, was shipped to the plant in tank cars from the Standard Oil Co. of Ohio at Latonia, Ky. Near the tank-car siding was a Leffel 75-hp boiler equipped with a Ray oil burner. A 10,000-gallon fuel-oil tank near-by supplied the needs of the burners on the drier and boiler.

Steam from the boiler heated the tank cars and also the two 11,500-gallon asphalt-storage tanks that were mounted on a flat car sitting on the track. A Viking 3-inch asphalt pump transferred the bitumen from the tank cars to the storage tanks. From the tanks it was pumped to the pugmill by a Viking 2-inch pump.

A single Murphy 150-hp diesel engine was the prime mover for the asphalt plant. The diesel ran an Electric Machinery 100-kw generator which in turn operated six electric motors. The largest motor, a 60-hp unit, drove the feeder, cold elevator, drier, and dust collector. A 40-hp motor turned the pugmill. Two



C. & E. M. Photo
A batch truck gets a load of plant-mix at the Hetherington & Berner asphalt plant which Wayne Paving, Inc., set up for its 10-mile maintenance job in Indiana. At left a Lorain crane charges a bin.

10-hp motors operated the hot elevator and the 3-inch asphalt pump. Two 7 1/2-hp motors operated the shaker screen and the 2-inch asphalt pump. The plant was operated by Foreman Oliver Dun-

ham and a crew of four men.

Laying the Plant-Mix

From the pugmill the 2,400-pound batches were discharged into trucks that

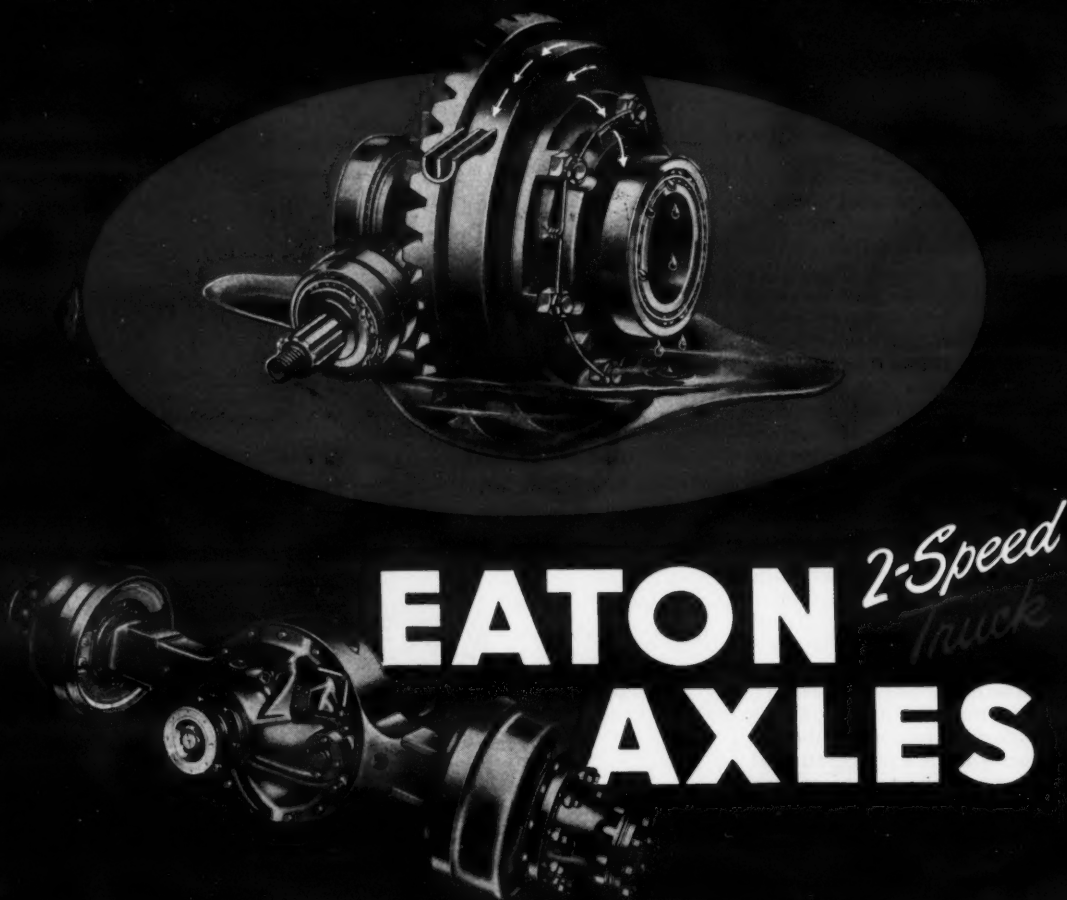
had backed under the plant tower. The temperature of the mix then ranged between 300 and 325 degrees F, so that even with some heat loss in transit the material was always placed on the road at not less than 250 degrees F. As the trucks left the plant they were weighed on a Winslow truck scale. On an average, 10 trucks were employed when the binder was being laid, with the average haul about 5 miles. Each truck carried 5 batches of hot-mix or a total load of 6 tons.

The two 1-inch binder courses were laid one on top of the other by an Adnun Black Top Paver. Since the work was done in hot weather, each course was immediately rolled by a Buffalo-Springfield 10-ton tandem. The tandem roller was followed by a Galion 10-ton 3-wheel roller. A flat-bed truck which mounted a 500-gallon water tank serviced the rollers and paver, and also supplied them with fuel and oil.

Through the city the plant-mix was laid in lanes varying in width from 10

(Concluded on next page)

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to 12 feet. On the open road the lanes were 11 feet and 11 feet 6 inches for the 22½-foot width. This was done to avoid having a longitudinal joint down the center of the road. So that this joint between the lanes would not be carried down through the two courses of binder, the 11-foot lane on the upper course was laid over the 11-foot 6-inch lane on the bottom course.

A crew of 8 worked the paver, including Foreman Ross Esterline, a paver operator, 2 rakers, 2 laborers, and 2 roller operators. The shovels and rakes were kept clean with a can of kerosene carried along on the paver. Working a 12-hour day from 6 a.m. to 6 p.m., the contractor laid around 800 tons of binder per day.

Rock-Asphalt Wearing Course

When the two courses of binder were completed, they were topped with a wearing course of rock asphalt, laid at the rate of 60 pounds per square yard. The rock asphalt, on arriving at the plant in open railroad cars, was heated to a temperature of 200 degrees F by inserting steam jets into the material. Steam for the heating was furnished by a Leffel 75-hp boiler. The heated rock asphalt was then loaded into trucks by the crane and clamshell bucket, and laid on the road by the black-top paver. Little rolling was required. During all the paving operations, traffic was maintained on the lane not being worked. William McComb was Foreman in charge of the rock-asphalt paving operations.

The rock asphalt has a fairly fine gradation with all the material passing the ¾-inch sieve. Not more than 1 per cent was retained on the ½-inch sieve, nor more than 20 per cent retained on the No. 4 sieve. The natural bitumen content ranges between 6.3 and 8.5 per cent.

Widening and Binder Mixes

The gradation of the widening and binder plant-mixes, together with their bitumen contents, is as follows:

Sieve Size		Per Cent	
Passing	Retained	Widening	Binder
1½-inch	1-inch	10-25	5-50
1-inch	½-inch	25-55	5-50
½-inch	No. 4	5-30	10-60
No. 4	No. 6	0-5	0-5
No. 6	No. 8	0-5	0-5
No. 8	No. 16	3-12	3-12
No. 16	No. 30	5-20	5-20
No. 30	No. 100	2-10	2-10
No. 100	No. 200	0-4	0-4
No. 200	....	0-2	0-3
Asphalt penetration 60-70		4-6	4-6
Total retained on No. 6		60-75	60-70

Quantities and Personnel

The major items of this maintenance project included the following:

Bituminous prime coat	32,173 gals.
Bituminous concrete base—widening	5,315 tons
Bituminous concrete—binder	16,730 tons
Rock asphalt	4,420 tons

For Wayne Paving, Inc., Victor Deininger was Superintendent. O. C. Fox was Project Engineer for the State Highway Commission of Indiana, with Harry L. Kelly Inspector at the asphalt plant. Charles Miser is Superintendent of Maintenance.

Plate-Handling Grips

A specially designed grip for handling metal sheets, plates, and other flat objects is announced by the Merrill Bros., 46-18 Arnold Ave., Maspeth, N. Y. It works on the two-way wedge-and-level fulcrum principle, and is said to hold tight to any object upon which its jaws can obtain a grip.

A handle-bar arrangement permits it to be carried between the first and second fingers. An eye-connector can be substituted for the handle to permit its use with a conveyor system or other mechanical-lifting arrangement. The Merrill Strong Finger grip is 6 inches long, 3½ inches wide, and weighs 28 ounces.

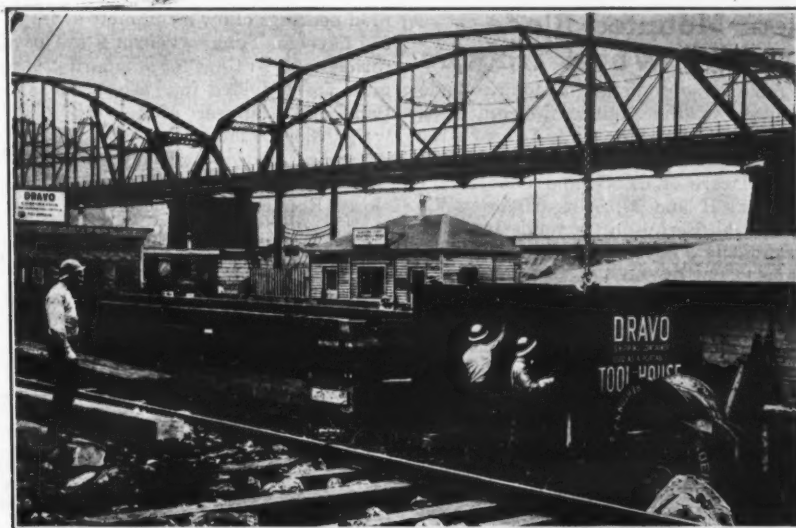
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 74.

High-Speed Hauling Unit

A 28-page catalog describing the features of its high-speed materials-handling truck has been issued by the Koehring Co., 3026 W. Concordia Ave., Milwaukee 10, Wis. The Koehring Dumptor is a pneumatic-tired dump-type truck for use in off-the-road materials-hauling operations. It can travel at the same speeds in either direction; thus it does not need to turn and back constantly in order to load or dump, the manufacturer points out.

Catalog No. 251 uses more than 55 photographs and illustrations to describe the operation of the Dumptor, and to show it in use on several types of jobs. Production charts, time-study results, and specifications are cited to bear out the lowered hauling costs which the manufacturer claims for its unit. Cutaway drawings point out the component parts of the machine.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 100.



This 277-cubic-foot welded steel shipping container which Dravo Corp. developed also serves as a portable tool house. As pictured here, it is providing weather-tight safe storage for welding equipment and hand tools at the site of a bridge substructure contract undertaken by the Dravo Contracting Division near Pittsburgh. It can be handled by crane or by truck, and will hold up to 6 tons.

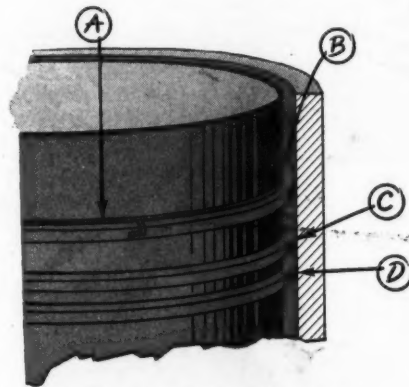


CASE D119A--MAINTAINING FULL POWER IN DIESEL ENGINES.

Operators of Diesels in all types of service report RPM DELO Diesel Engine Lubricating Oil materially reduces power loss in three ways:

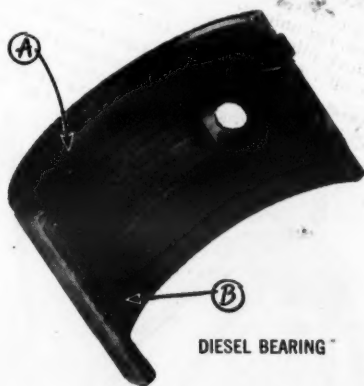
- Detergent compounds prevent ring-sticking, allow full ring tension against cylinder wall, and this minimizes compression loss.
- Metal-adhesion additive keeps full oil film on hot upper cylinder walls. These danger areas are often left unprotected by many oils.
- RPM DELO Oil maintains a tough oil seal that stops blow-by of combustion gases.
- An anti-oxidant increases the inherent stability of RPM DELO Oil's selected base stocks and resists lacquer formations on liners and piston skirts.

Other additives in this pioneer compounded oil prevent foaming, and control gum formations.



SECTION OF DIESEL ENGINE PISTON

CASE D119B--PREVENTING FREQUENT BEARING REPLACEMENT DUE TO CORROSION.



DIESEL BEARING

In normal operation, Diesel engines require excess oxygen and operate at high temperatures. Under these conditions many unstable lubricants tend to turn corrosive and attack the lead in the copper-lead structure of alloy bearings. RPM DELO Diesel Engine Lubricating Oil is especially compounded to prevent this cause of bearing failure.

- Selected base stocks are used that are naturally resistant to oxidation, the cause of most bearing corrosion.
- Anti-oxidation compounds in RPM DELO Oil further reduce the danger of corrosion.

In laboratory corrosion tests, copper-lead bearing strips immersed in RPM DELO Diesel Engine Lubricating Oil showed considerably less weight loss than those protected by similar type oils.

For additional information and the name of your nearest Distributor, write

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17th and Stout Streets, Denver 1, Colo.

Standard Oil Company of Texas
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Rear-Mounted Blade For Wheel Tractors

A rear-mounted earth-moving blade is made by the Danuser Machine Co., Dept. D, Fulton, Mo. It is designed for attachment to J. I. Case VA and VAC; John Deere A, B, G, and GM; International H and M; Allis-Chalmers C; Ford; and Ferguson tractors. It is hydraulically controlled by a lever accessible to the tractor-operator's seat.

The blade is 6 feet long and $\frac{3}{4}$ inch thick. The entire blade can be shifted 8 inches to either side to permit cutting beyond the tractor's wheel line. Trun-

nion bearings allow a complete swing of 360 degrees. Timken bearings are used throughout. Fittings for standard grease guns are provided for ease of lubrication. The Danuser Model GB blade weighs 368 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 24.

Concrete-Curing Blanket

A catalog describing the uses and features of its concrete-curing blanket is being distributed by The Sisalkraft Co., 205 W. Wacker Drive, Chicago 6, Ill. The

catalog explains the two methods of using Sisalkraft paper, and lists the advantages and recommended uses of both. The methods are thoroughly illustrated to show each steep.

The catalog tells how Sisalkraft paper is constructed, and includes a sheet of it for the reader's examination. A chart shows the comparative frost protection obtained with Sisalkraft and with other curing and protective blankets. It also shows some secondary applications for which the paper is adaptable.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 21.

Rugged-Type V-Belt

The addition of a newly developed Ray-Man V-belt to its line of industrial rubber products is announced by Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J.

This belt is designed to meet the need for tough, rugged drives, with strength members engineered for unusual service requirements. It has oil, heat, and static resistance, the manufacturer explains.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 119.

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TYPE "D" HEAVY DUTY BUCKETS
For severe service in excavating and dredging hard materials. Heavier and more rugged than Type "M" with longer and larger lower arm bearings. Sealed from grit.
Type "DX"
Still heavier than "D" with extra large shafts and bearings. For dredging and the severest kinds of excavating.



TYPE "M" GENERAL PURPOSE BUCKET
Primarily for excavating but efficient in handling compact materials, large crushed rock, etc. Overloads in loose materials.
Narrow buckets available for trench and cramped excavating.



TYPE "K" STANDARD BUCKETS
For rehandling bulk material. Light but strong. Can be equipped with counterweight jackets, also bottom teeth for certain kinds of digging.
Light and Extra Light Type "K"
Built lighter for greater capacity in materials which do not require the weights of the Standard Type "K" for penetration.



GRAPPLES
of various designs are available for handling stone, scrap iron and pulpwood.



TYPE "S" BUCKETS
Wider and heavier than corresponding sizes of "K" Buckets. For unloading barges, flat cars, stock pile work, etc. Good for "clean up".
Light Type "S" Rehandling Buckets
Lighter than Standard "S" Buckets but designed to have equal strength and durability.



SPECIAL TEETH
for trench excavation and straight down digging with vertical and parallel walls are available for "M" and "D" Buckets.

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Portrait in Print

By BILL QUIRK

Two World Wars Have Their Part In This Professor-to-Contractor Story

SCRATCH a Floridian and you will probably discover that he is a native of any place but the Sunshine State. That is true of Alexander Brest, Secretary-Treasurer of the Duval Engineering & Contracting Co. of Jacksonville, Fla., who served through two world wars and holds the somewhat unique distinction in construction circles of having been a college professor before becoming a contractor.

Alexander Brest was born 54 years ago in Boston, Mass., where he was graduated from the Massachusetts Institute of Technology in 1916 with a Bachelor of Science degree in civil engineering. In July of that same year he went to work for the Massachusetts State Board of Health as Assistant Engineer. The following May he entered World War I as a First Lieutenant in the Sanitary Corps of the U. S. Army. He was sent to Camp Joseph E. Johnston near Jacksonville—now the site of the U. S. Naval Air Station.

The Road Back

At the end of the war he returned to his former position in New England and also took some post-graduate summer courses at both M.I.T. and Harvard. Later he taught in summer school at M.I.T. and at the Stevens Institute of Technology at Hoboken, N. J. But Florida had left a strong and favorable impression on the youthful engineer when he was stationed there as an Army officer. He resigned his Massachusetts position and the cold northern winters to become a sanitary engineer with the Florida State Board of Health, with headquarters in Jacksonville.

After a year and a half in that capacity, Brest was offered an assistant professorship in civil engineering at the University of Florida located in Gainesville. He accepted, and in 1921 embarked on a teaching career that lasted until 1924. During those three years he taught reinforced-concrete design, hydraulics, municipal engineering, water supply, and sewage disposal. Today the academic impress has not been lost, although contracting has claimed his attention for over twoscore years.

The Professor

Brest always has a slide rule within easy reach, and the engineering library at his office is well stocked with modern texts.

"I was keen on teaching", he reminisced. "I entered that profession to learn more about engineering, and considered it excellent training for that purpose. Looking back on my years at the University I have nothing but the most pleasant memories. I enjoyed every moment of them. But I wanted a more active life, and so resigned to become a contractor. Everyone predicted that I would fail promptly. They argued that a college professor could never be practical enough to last as a contractor."

He smiled as if to say it's dangerous to generalize. Alex Brest got into the more active life by organizing in 1924 the Duval Engineering & Contracting Co., with George H. Hodges as President and himself as Secretary-Treasurer. The firm engages in general contracting, specializing in highway and bridge construction in Florida and Georgia. It is named after Duval County of which Jacksonville is the county seat. Company headquarters are located in a big, roomy, two-story building on the site of a former World War II shipyard along the St. Johns

River in Jacksonville. The company bought both the building and property after the last war.

Alex Brest's blue eyes may have the thoughtful, penetrating look of a college professor, but his jaw has a certain line usually associated with tenacity of purpose. His well knit figure is trim from the outdoor sports such as golf, tennis, swimming, boating, and fishing, that he follows in the mild-year-round Florida climate. His hair is grey around the edges, and his skin is tanned.

Contractor

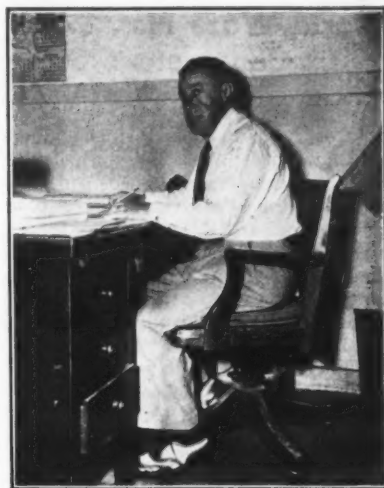
From the very first job, Brest proved

that a college professor could be a practical contractor. That "first" was a subcontract for a lime-rock-base surface-treatment project from Callahan, Fla., to the Georgia state line along U. S. 1. And the company has progressed steadily from that beginning.

"Some contractors say that a man must go broke a couple of times before he can call himself a real contractor", Brest observed. "I don't follow that line of reasoning. When we figure a job, we approach it from two different aspects. In one way we calculate the possible profit; in another, we candidly estimate how much we would lose by unfavorable conditions such as unexpected ground water, unforeseen rock in unclassified excavation, and such imponderables. We make our bid only after such a careful study."

"All contracting is naturally something of a gamble. But underground work such as sewer construction or dredging involves more risks than other kinds. We have a couple of suction

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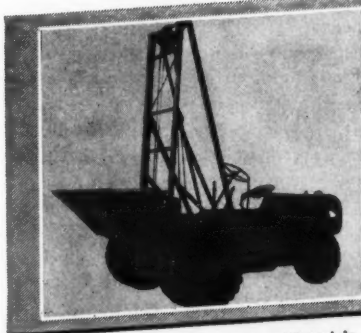


C. & E. M. Photo

Alexander Brest is Secretary-Treasurer of the Duval Engineering & Contracting Co., of Jacksonville, Fla., which he organized in 1924. He is unique in construction circles for having been a college professor before a contractor.



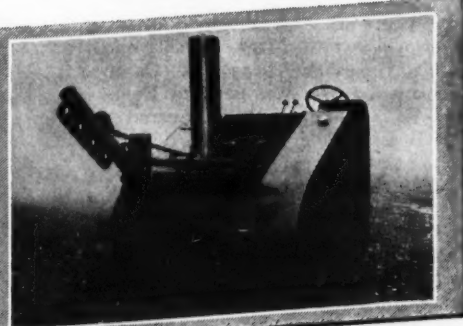
MATERIALS HANDLING and CONSTRUCTION EQUIPMENT Reducing Costs All Around!



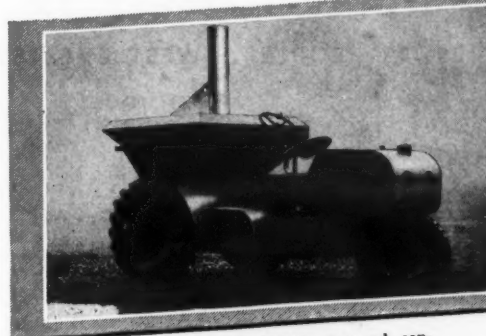
SCOOPMOBILE—Tricycle type Materials Handler with attachments for every type of load. 4 speeds both directions.



WAGERNOBILE DUO-WAY LIFT—16,000-lb. capacity. Operates equal convenience in either direction.



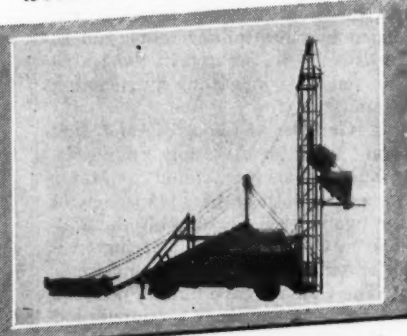
WAGERNOBILE FOLDAWAY LIFT—Entire 11 ft. of Hoist folds into chassis like a bellows camera. Capacity 6000 lbs. to 8 ft., 4000 lbs. to 11 ft.



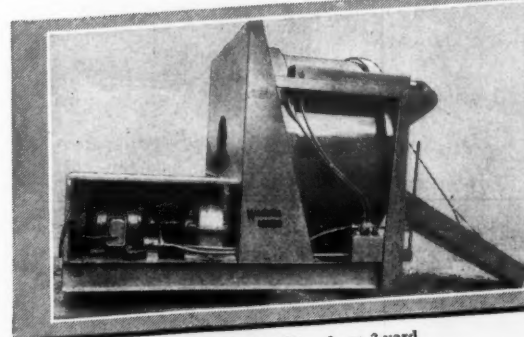
WAGERNOBILE BUGGY—1-cu. yd. concrete hopper. Pouring radius 180°. Power steering. 4 speeds both directions.



TOWERMOBILE-CRANE—Portable hoisting tower (45-ft.) and crane boom (20-ft.) with 9000-lb. capacity.



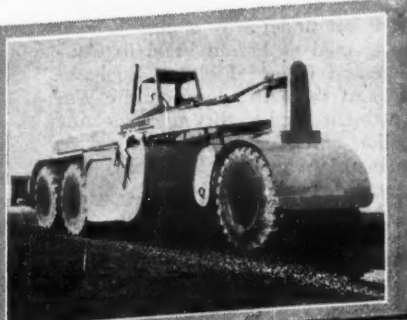
MIXERMOBILE—Portable concrete mixing and elevating plant. 2-yard mixing drum. 45-ft. tower.



WAGNER MIXER—2- or 3-yard stationary mixing plant.



WAGNER TOWER—35-ft. stationary tower with 10-ft. extensions available.



WAGERNOBILE SCRAPER-DOZER—All wheel drive—self loading. 15 cubic yard capacity.

There's a dealer near you... Write for his name and address

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World Wars Play Part In Contractor's Story

(Continued from preceding page)

dredges with 12 and 15-inch pumps which we use to dredge up shells for road-base construction, or for commercial dredging. Once we built a road across two lakes in Orlando by means of hydraulic fill. We dismantled a dredge, shipped it to the site on flatcars, and then set it up in the lake."

Just before and during the last war, the Duval Engineering & Contracting Co., in conjunction with two other Florida contractors—The George D. Auchter Co. and Batson-Cook Co.—constructed more than 700 military projects in Florida for the Navy. These facilities represented \$68,000,000 worth of engineering construction, and included the U. S. Naval Air Stations at Jacksonville, Green Cove Springs, Yellow Water, Mayport, and Banana River. For these noteworthy achievements the contractors in 1943 received the Army-Navy "E" Production Award. By that time Alex Brest was back in the Army as a Major, and was assigned to receive the award for the contractors. The presentation ceremonies were marked by an unusual sight—Rear Admiral Ben Moreell, a Naval officer, presenting the "E" to Major Brest, an Army officer.

Army Career

Alex Brest entered World War II as a Major in September of 1942, twenty-five years after he joined up for the first world war. After a fast one month's refresher course at Camp Claiborne, La., he was sent to Richmond, Va., to take a battalion overseas. While Brest waited a week for definite orders, someone happened to look over the Major's experience record, and made the startling discovery that here was the very man best qualified to organize a school to train officers and enlisted men for the construction of overseas airfields.

The Army was at a big disadvantage in this respect. The Navy had already skimmed off the cream of construction workers by offering ratings or commissions in the Seabee Battalions. The Army, drafting everyone as a private, extended no such inducements, and so had to start from scratch in the training of engineering and construction personnel.

Brig. Gen. S. C. Godfrey, the first general officer of Aviation Engineers, later killed in service, called for Major Brest and told him to start a school within two weeks. Fortunately the Major had in Col. Russel M. Herrington a superior officer with wisdom and foresight. The Colonel gave him all possible support and guidance, contributed helpful suggestions, and directed the overall work of the school which was conducted by Brest.

The first such school was organized on a more or less unofficial basis, but after it got under way similar schools were opened at March Field in California, and Geiger Field in Spokane, Wash. At the latter location the War Department, under the guidance and direction of Col. Brest, established its permanent Army Air Force Aviation Engineer School.

Engineer Aviation School

The task of getting such a school under way was enormous. Brest had to work with whatever men he could get, since the draft was far from selective in assigning him men with any engineering or construction experience. Aptitude tests were used, but personnel interviews were considered a better yardstick. Physical stamina was a prime requisite. Farm boys, generally handy around farm machinery, made good equipment operators. But on the whole Brest and the rest of his teachers usually had to go and point to a machine and say "This is a grader" or

"This is a dragline" in order to acquaint the men with tools they were to use. Besides being commandant of this first school, Major Brest also commanded a battalion. But as soon as he had trained his command to a certain point, it was taken from him and in its stead he got green rookies. The job seemed endless.

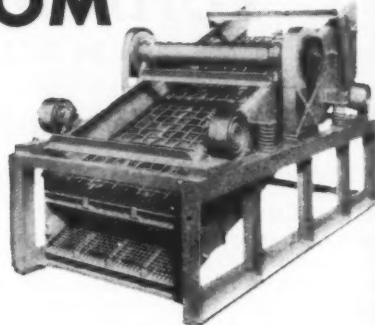
To simplify the school training he went back practically to the a, b, c's, and tried to show everything pictorially in easy-to-understand textbooks. One of these books, "Job Planning and Equipment", is a masterpiece of its kind. Every phase of construction is illustrated so that a student will know what he can and should do with a ripper, power shovel, crane, or any other piece of equipment. Humor is injected wherever possible. Thus in the earth-moving section, downhill hauls are stressed in balancing quantities by showing a slow-moving snail which resembles a truck toiling uphill with a heavy load.

(Continued on next page)

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FOR LIGHT,
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WET or DRY

The Double-Deck Heavy Duty 4' x 10' OVERSTROM Vibrating Screen illustrated is one of many types and sizes available for screening of crushed rock products, sand and gravel, limestone, cement, gypsum, borax, mining ores, salt, coal, coke, etc. Screening machinery, engineered by pioneers and accepted by industry throughout the world for the past 25 years, is available for various applications, in any type or size, single, double or triple-deck models, open type or dust-housed com-



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Below are listed nine of the many Schramm models, portables ranging from 20 to 420 cu. ft. of actual air, the stationary ranging from 2 to 600 cu. ft. displacement.

On all models performance records are evidence of their high quality. You will find the name Schramm written on every important page in compressor history.

Features you get in Schramm are: 100%

water cooled, assuring ideal performance summer and winter; mechanical intake valve, forced feed lubrication, and electric-starter starting. All Schramms are compact, lightweight, easy to operate.

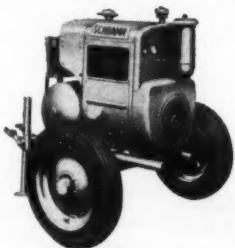
We invite you to write today for fully illustrated catalog describing in detail each of the Schramm Air Compressors shown here... plus a wide range of other models. We feel the Schramm story is a good one, and offers you a sure way to get your many compressed air jobs done quickly, efficiently, and economically.

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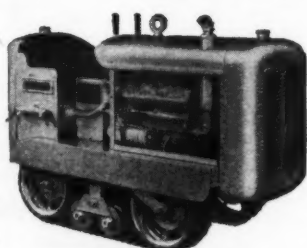
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20/35 Model Compressor



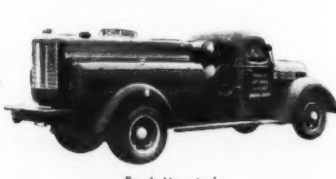
No. 60 Self-Propelled Compressor



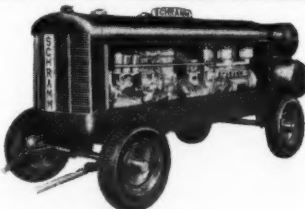
Two-Wheel Trailer Mounting with Tool Box



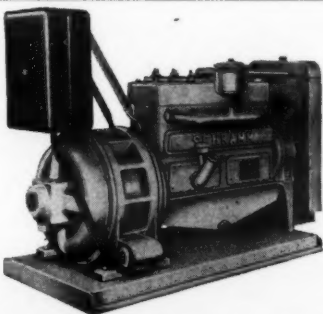
Skidded for Truck Mounting



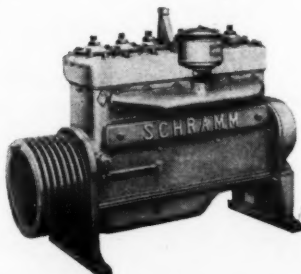
Truck Mounted



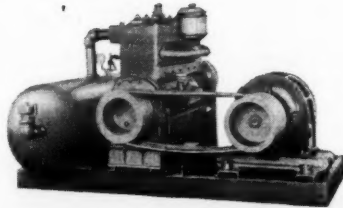
Diesel Engine Drive



Built-in Motor Drive with Cooling Unit and Starter



"V" Belt on Flat Pulley Drive



"V" Belt Drive with Air Receiver

A typical runway profile was laid out in the book, along with an operation schedule and list of equipment necessary for grading and paving it. Nothing was overlooked in the material list except costs. The professor-contractor combination in Major Brest was producing results. A syllabus and outline for the school was drawn up which included a program for every hour of the day, every day of the week. Four main courses were given: (1) Utility—which took in all skilled trades; (2) Engineering—including surveying, drafting, and soil mechanics; (3) Heavy Equipment—for operator instruction; and (4) Miscellaneous—which included everything from fire fighting and demolition to being a radio operator.

Legion of Merit

Practical construction was coupled with the school work. After four intensive weeks under field conditions, the men had at least a fair knowledge of how to lay a concrete or asphalt pavement, or build a bridge or cul-

vert, etc. In this school 55 different trades were taught, such as electrician, welder, carpenter, machinist, blacksmith, concrete mason, etc. Besides the technical skills the men also were trained to fight in defense of what they would construct.

When the aviation schools were running smoothly in this country, Major Brest was sent to Brazil to make a survey and report about the establishment of similar schools for the Brazilian Army.

For the great part he played in establishing these U. S. Army training schools, Alex Brest, now Lieutenant Colonel, received the citation and award of the Legion of Merit. In September 1945 he was put on inactive status and went back to contracting.

"If we had to train men for that same work right now," Brest stated, "new courses would have to be given to keep up with the advances made in military technology. For instance, Engineering Aviation would have to build rocket-launching platforms as well as airfields.

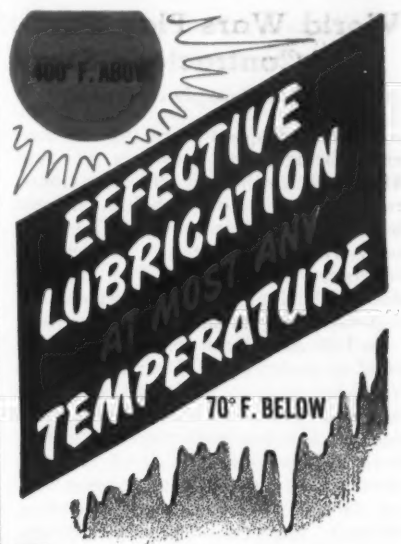
The Germans had them in the last war but we didn't."

Civilian Honors

In 1946 Alex Brest was honored by the Florida Engineering Society by being tendered the engineer-of-the-year award. Also that year, he was elected President of the Florida Road Builders Association, and reelected in December 1947 to another one-year term. At the 1947 meeting of the Southeastern Associated Equipment Distributors in Miami last winter, Brest created something of a sensation with a frank comprehensive talk on how equipment distributors and manufacturers can help contractors.

His contracting company recently finished a section of dual highway with three lanes in each direction on the road out of Jacksonville towards St. Augustine. Currently the Duval Engineering & Contracting Co. is engaged on a 15-mile dual highway from Jacksonville to Jacksonville Beach. This

(Concluded on next page)



The fact that LUBRIPLATE Lubricants are able to meet extreme temperature conditions, demonstrates the ability of these products to cope with the wide variations often found in everyday industry. Besides this feature LUBRIPLATE Lubricants possess attributes not found in conventional lubricants. Write for literature.

LUBRIPLATE

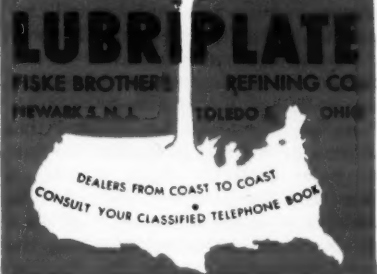
Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

LUBRIPLATE

Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE

Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.



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N. B., Cash, check or postage stamps will be entirely acceptable.

World Wars Play Part In Contractor's Story

(Continued from preceding page)

contract includes two reinforced-concrete bridges and amounts to over \$1,000,000. Both road jobs have lime-rock bases with asphaltic-concrete binder and surface courses. The company owns two lime-rock quarries at Newberry and Williston, Fla. The Industrial Drilling & Boring Corp. of Jax is a subsidiary to the contracting firm.

In 1939 Alex Brest forsook bachelorhood to marry Mia Helen Deutsch, a Viennese beauty who had come to America that year when her native Austria had become untenable. They have a 7-year-old son, Paul Andrew Brest. Last year the contractor and his family visited Europe, traveling through England, France, Belgium, Italy, and Switzerland.

Despite his many activities, Alex Brest always finds time to talk to young college engineering students who come to him for advice. He occasionally is a guest lecturer at the University.

"But sometimes I am on the listening end too", he laughed. "Once in a while on some of my highway projects I come upon one of my former students who is now a State Road Department resident engineer or inspector. Where I used to tell him how to build a road or a bridge, he now tells me. That's one way of getting even with his old professor."

Sampling Equipment For Subsurface Soil

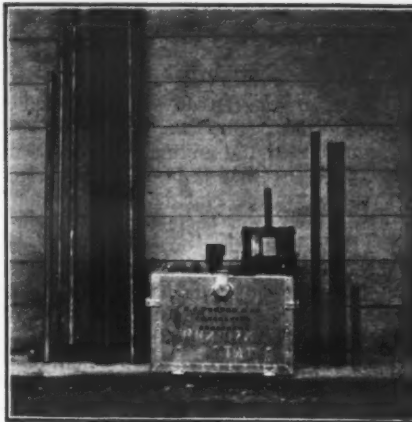
Sampling equipment for determining subsurface soil conditions is made by O. J. Porter & Co., 516 Ninth St., Sacramento 14, Calif. This equipment can also be adapted for use in mapping ground-water conditions, locating water-carrying strata, and similar investigations. It is made in both hand-operated models and power-driven models.

The major components of the Porter soil sampler are the cutting point; sampler sections; couplings; and a plug, screw, and nut assembly. The sampler sections, couplings, and the cutting points are bored out on the inside in order to receive brass-tube sample retainers. These retainers are designed to permit the ready removal of the cores from the sampler, and to prevent disturbance of the specimen.

The sampler is so constructed that the interior rod and plug close the cutting point until the depth is reached where the samples are desired. By turning the inside extension rods in a right-hand direction and engaging the threads in the nut section, the plug can be released, raised, and held in place. The sampler is then driven an additional 2 or 3 feet to obtain the sample. The outside extension tubes are then turned in a right-hand direction, shearing off the soil core at the bottom of the sampler.

Turning the inside rods in a right-hand direction further retracts the plug and forms a suction seal between the plug and nut section. When the sampler is removed by means of the pulling grip and jack, the cutting point, nut section, and plug assembly are disconnected and the sample retainers are taken from the tube. These are capped and labeled and become permanent soil records of the boring. Additional soil laboratory tests can be made on them at any later date. The sample retainers have a 1-inch outside diameter and are 6 inches long. The hand-operated rig can be used to depths of from 70 to 100 feet, depending upon subsurface conditions.

The power-operated sampler is similar in construction and operation to the hand model. It contains aluminum or brass sample retainers 2 inches in diam-



Above is the 1-inch hand-operated Porter soil-sampling outfit for subsurface soil studies. At right is a 2-inch power-driven sampler being operated with Porter's own design of combination drill rig.



eter and from 4 to 6 inches in length. The sample section is 5 feet long. Standard diamond drill PK or E rods provide extensions in 10-foot lengths. The sam-

pler is driven down by a 500-pound hammer actuated by a spudding beam. It can be mounted on any standard cable-tool drill rig, the manufacturer

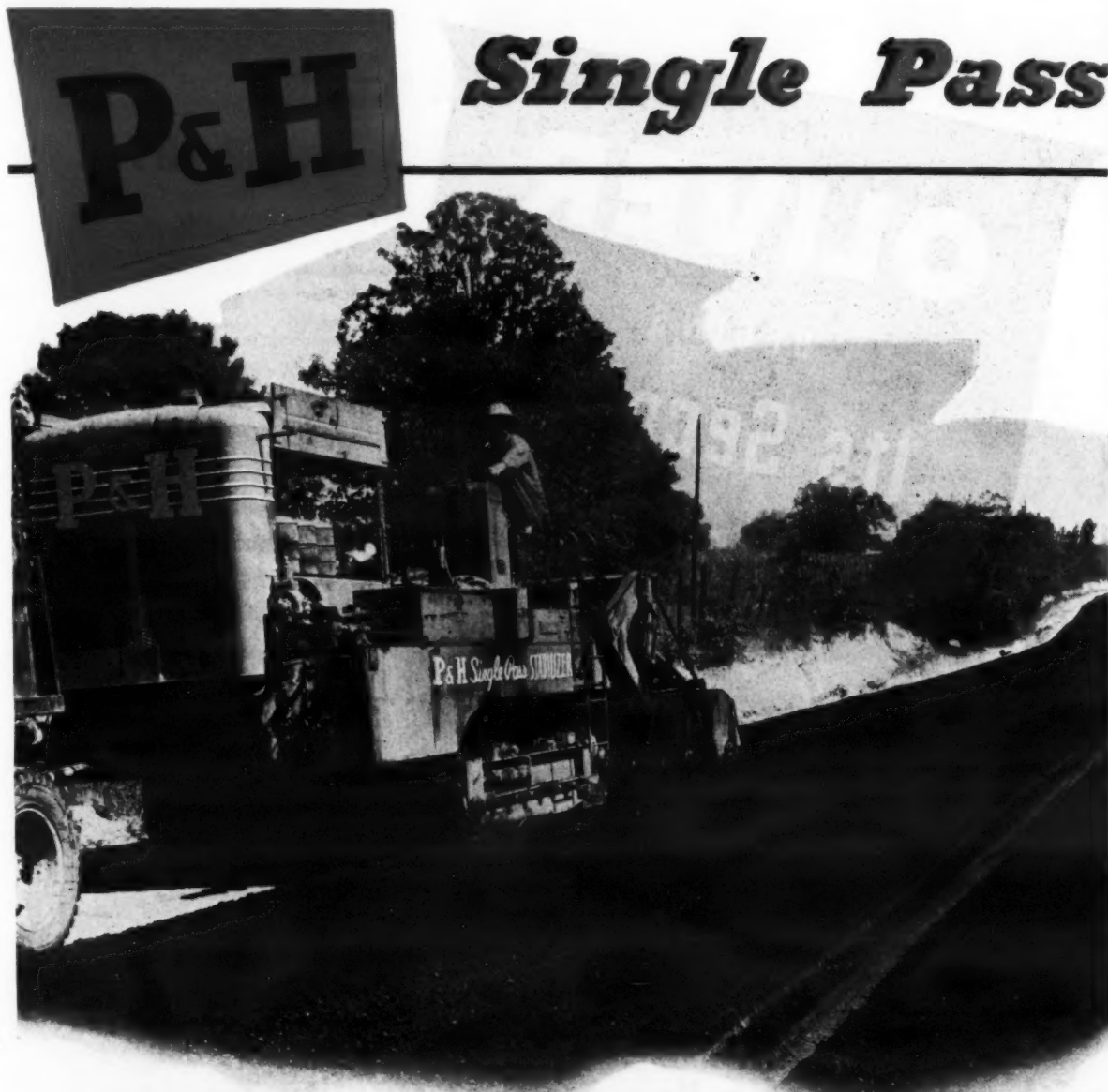
points out.

Casing is required when skin friction becomes too great to permit ready driving and pulling of the sampler. This casing is sunk by jetting or churn-drill methods to the depth previously sampled. Sampling is then carried below the casing in the usual method. All types of foundation material, up to the hardness of soft rock, may be sampled with this equipment, according to Porter.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 90.

LeTourneau Appointments

The appointment of two Manufacturer's Representatives for the west coast has been announced by the Tournalayer Division of R. G. LeTourneau, Inc., Longview, Texas. H. B. Landis is assigned to sales and promotion of Tournalayer and Tournamixer equipment; and A. G. Quinn will handle the Tournacranes and Tournahaulers.



PROCESSING 3,000 LINEAR FEET PER DAY cuts the cost of road building

Here, in Mississippi, as in many other states, the P&H Single Pass Soil Stabilizer is setting up new standards in producing good, all-weather roads more quickly — and at lower cost.

This 10½ mile stretch of road, 22 feet wide and processed to a depth of 6 inches, was completed in only 21 working days.

Maximum utilization of native, in-place soils reduced the need for importing foreign materials, thus reducing materials costs to a minimum.

With the complete processing accomplished by the P&H Stabilizer, the only auxiliary equipment required included a disc type plow, one sheep's foot roller and tractor, rubber tire roller and one motor grader.

Accurate control of all factors such as uniform processing depth, thorough pulverization, accurate proportioning and blending, including liquid etc., made it possible to meet specifications exactly and produce a road of predetermined load carrying capacity. Complete information is available on request.

Drilling

A line scribed in George E. Broadway items list Holenast patented for driving engine, a series for ment. The ca models an eration. cussed, an ship to th catalog o showing drilling, similar op tions of offices. Copies tained fr enclosed

Per

Here to full zation

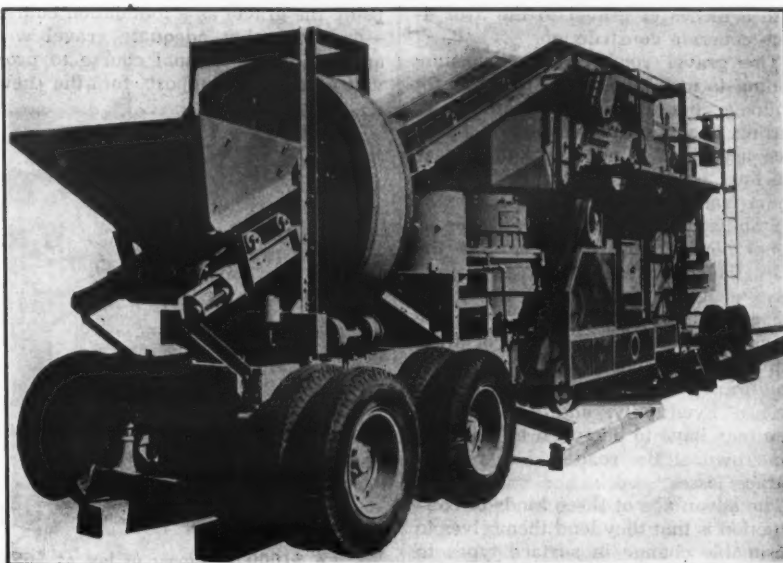
1. Con
2. Pulv
3. Blen
4. Cre
5. Dis
6. Mix
7. Lay
8. Do

Drilling Equipment Folder

A line of drilling equipment is described in the 1948-49 catalog of the George E. Failing Supply Co., 424 E. Broadway, Enid, Okla. Among the items listed are the No. 2500 and 1500 Holemaster, the Failing 750 Sizmo, a patented fluted kelly, a power take-off for driving portable drills from a truck engine, and a complete line of accessories for use with this type of equipment.

The catalog illustrates each of these models and describes its features of operation. Each component part is discussed, and where relevant, its relationship to the other parts is described. The catalog contains several photographs showing the equipment in use for well drilling, core drilling, blasting, and similar operations. It also has illustrations of the Failing plant and branch offices.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 1.



Crushing is handled by a cone crusher in this new Cedarapids portable plant, designed for secondary crushing operations where material is fairly uniform in size and fines are not particularly desired.

New Portable Plant Has a Cone Crusher

A portable crushing and screening plant is announced by the Iowa Mfg. Co., 916 N. 16th St., Cedar Rapids, Iowa. The plant consists of a 22-inch Symons pedestal-type cone crusher, a 42-inch x 10-foot double-deck horizontal vibrating screen, and the necessary conveyors, chutes, drives, and hoppers. The truck is offered with a choice of steel wheels or pneumatic tires.

The plant is especially designed for secondary crushing operations where the material fed to it is fairly uniform in size and requires a reduction of only one or two sizes, and where fines are not particularly desired. It may be used in a unitized plant set-up where the primary crushing is handled by a portable primary or a scalping unit.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 11.

New Model of Truck Has a 188-Hp Engine

A new truck model has been added to the line of the Four Wheel Drive Auto Co., Clintonville, Wis. Rated at 33,000 pounds gross vehicle weight, it is powered by a 140-GZ 554-cubic-inch high-compression gasoline engine. This engine is said to develop 188 hp at 2,600 rpm, and 460-foot pounds of torque at 1,000 rpm. The Model ZU truck is especially recommended by the manufacturer for highway maintenance work, snow-removal operations, contractor hauling, and concrete truck-mixers.

Front and rear axles of the ZU feature 17-inch ring gears and pinions. Pinions are straddle-mounted to minimize deflections. Inclined roller-bearing king pins on the front axle provide a relationship between the pivot point and tread line which is said to result in easy steering, better tire mileage and greater safety. The hood and fender skirting are designed to provide maximum accessibility for mechanics.

The Model ZU has the FWD Model S constant-mesh transmission with helical gears and sliding jaw clutches. A vacuum-operated control lock for the center differential is another feature of the ZU. An indicator light glows red while the differential is locked, and switches off when the center differential is unlocked.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 27.

Concrete-Pouring Aids

A partial list of its line of concrete-pouring equipment has been prepared for distribution by the H. B. Sackett Screen & Chute Co., 1679 Elston Ave., Chicago, Ill. This equipment includes hoist towers, chutes and discharge spouts, receiving hoppers, tip buckets, dump buckets, concrete cars with railroad wheels, and bin gates.

Catalog No. 45 shows examples of each of these types and lists the sizes and styles in which they are available. It describes the features and uses of each, and also lists complete specifications, capacities, dimensions, and prices. The catalog includes ordering instructions and information on terms, and conditions of sales.

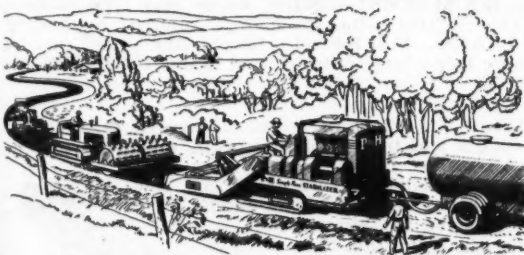
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 93.

Richkraft Midwest Agent

John H. Huston is the new midwest Sales Representative for the Richkraft Co. He will cover Michigan, Indiana, and northwestern Ohio, from his office at 18975 Stansbury St., Detroit, Mich. The Richkraft Co. handles a line of concrete-curing compounds and building papers.

Soil Stabilizers

Another example of P&H Speed and Efficiency



Performs these 8 Basic Requirements in a Single Pass

Here again, the P&H machine proved its ability to fulfill these 8 basic requirements of soil stabilization with definitely predetermined results.

1. Control processing depth for accurate proportioning.
2. Pulverize the soil thoroughly.
3. Blend materials uniformly.
4. Create a true sub-grade.
5. Disperse the liquid through the entire volume in measured quantity.
6. Mix the coated material uniformly.
7. Lay the completely processed material in a fluffy, even depth, ready for compaction.
8. Do all these things in one pass—at a good rate of speed.

THESE ARE THE FACTS ABOUT THE JOB

Location of project — Highway 19, Lauderdale County,

Mississippi — from Alabama line to Vinville.

Length of project — 10.48 miles.

Width of roadway — 22 feet.

Depth of treatment — 6 inches, compacted.

Type of soil — Natural soil of A-2 Classification with PI of 5 or less and Clay having PI of 19 Combined with sand to produce material of A-2 Classification.

Stabilizing agent — Asphalt — R.C.2 (4.32 gallons per square yard equal to 7% by weight of dry soil).

Rate of production — Approximately 3,000 linear feet per day.

Traffic was maintained through this road during construction.

The P&H Single Pass Soil Stabilizer is capable of handling any type of admixture. If you are considering the construction of base courses, secondary roads, airport runways, etc., investigate the performance of the P&H Single Pass Stabilizer under conditions similar to your own. Ask for the facts.



County Maintenance Of Secondary Highways

Counties Faced With Responsibility For Maintenance Under Secondary Road Program; Methods Outlined

♦ MANY counties throughout the nation now face new standards of highway maintenance, as a result of the Federal Secondary Road Program. This was pointed out at the American Road Builders' Association Road Builders Conference last January by Ray B. Traver, County Superintendent, Onondaga County, N. Y. Mr. Traver went on in his paper to outline the types of maintenance now in use by highway departments.

Counties Have Responsibility

Prior to the present Federal Act, counties in many states were not a factor in maintenance of local roads. But the Act provides that if a county wishes to take part in the Secondary Program, it must guarantee to provide adequate future maintenance of the projects—and in a manner acceptable to the state highway department.

How well counties assume the responsibility, Mr. Traver said, will affect a continuation or extension of the Federal Act as it applies to secondary roads. Therefore, unless a county can see a constant source of revenue with which to perform this duty, it should not endanger the programs in other sections of the country by assuming this maintenance burden.

Revenue

The reliance of local highway organizations upon political subdivisions for annual appropriations is dangerous, Mr. Traver said. They should, instead, have funds set up by law upon which they can depend from year to year.

Moreover, their ability to maintain a system of highways adequately should be the guiding influence in setting up a program—not the percentage of their entire mileage. This is true, said Mr. Traver, if the counties finance the original cost of construction or if the roads are built at no cost to them and presented to them as gifts. The states are the ones responsible to them for allocation of funds, and their responsibility to insure adequate maintenance continues.

If the ability of a county or other subdivision to maintain a system properly has been established to the satisfaction of its state highway department, the design and construction of the various projects can be carried out along well defined engineering lines. The problem of maintenance is then reduced to a minimum. We all know, said Mr. Traver, that spreading our construction funds to cover a large mileage is false economy. The cheaper the type of construction, for a given amount of traffic, the higher the cost of maintenance.

Types of Maintenance

Problems involved in maintaining secondary roads are no different than those encountered on the regular system of highways. There are two methods or types of maintenance to be considered: preventive maintenance, which anticipates requirements on a section of road and takes steps before failure or deterioration actually occurs; and corrective maintenance which waits until excessive wear on the surface is evident and then takes the necessary steps to correct the condition. Needless to say, the preventive method is much more economical in the long run, Mr. Traver reminded his audience.

In the Secondary Program, every type of construction is undertaken, ranging from the gravel road with only

4 to 5 inches of gravel to the 3 or 4-lane concrete construction.

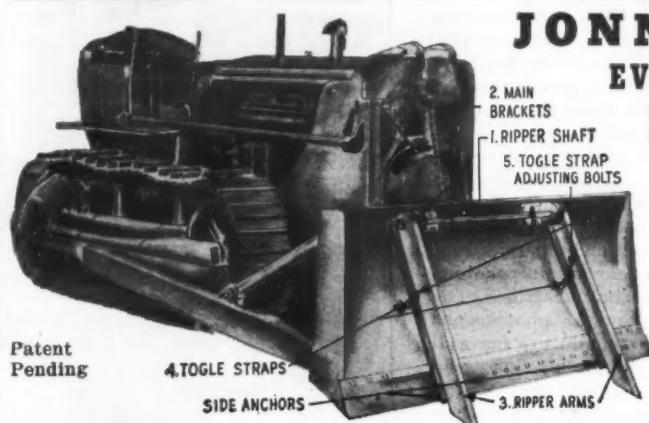
The gravel road requires constant honing to maintain surface contour for drainage and to eliminate potholes or rutting. Frequent replenishment of surface aggregate is necessary to replace the fines or binder materials dispersed under traffic.

Stabilized mixtures, too, require occasional honing and replacement of the fines. They need moisture as a preventive against loss of the fines, and this can usually be provided by the use of chemicals. The frequency of their application depends upon the degree of stabilization and the atmospheric conditions. Eventually, additional aggregate may have to be added to maintain the crown of the road and to replace surface losses.

The advantage of these kinds of construction is that they lend themselves to reasonable change in surface types to take care of increased traffic conditions. Oiled surfaces, gravel mulch, and mixed types are available and can be placed,

using the gravel as a foundation course—assuming that adequate gravel was applied in the original course to provide sufficient support for the new

wearing surface. In applying the new surface, said Mr. Traver, it is advisable not to disturb the original gravel surface. (Concluded on next page)



A \$1000.00 Ripper as low as \$65.00.
Made in 4 sizes to fit any dozer and controls.
State H. P. and HEIGHT of dozer blade.
Free booklet. Dealers wanted.

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EVER READY
RIPPER**

Up to
50 H.P. \$65
50 to 70 \$75
70 to 90 \$85
over 90 \$95

Rentals \$1.00
per day.
Minimum \$25.00
for 30 days.

JONNUM MFG. CO.
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SPECIAL 5 LITTLE GIANT TRUCK Cranes

Special offering of 5 brand new Little Giant Crane units. These complete units ordinarily sell for over \$8000.00 but are priced exceptionally low for this special sale. These units are readily adaptable to mounting on truck or half-track, or other self-propelled vehicles. Here is the answer to greater operating profit in the construction field. The new Little Giant offers you greater profit on the job, through speed of operation, fewer wearing parts and greater fuel economy. There is greater profit in your job with the new Little Giant. Write today for complete literature.

SPECIFICATIONS:— CAPACITY AS DRAGLINE—16½ cu. ft. bucket. CAPACITY AS SHOVEL OR BACKHOE—Full ½ cu. yd. CABLE SIZE— DRAG CABLE— ¾ in. 42 ft. long. HOIST CABLE— ¾ in. 85 ft. long. BOOM LINE— ½ in. 160 ft. long - 4 part line. WEIGHT— Approximately 12,000 lbs. STANDARD BOOM LENGTH— 30 ft; 5 and 10 ft. inserts. BOOM POINT SHEAVE— 16 in. dia. DRUM SIZE— 12 in. dia. GROOVED. BOOM HOIST— Safety worm gear type running in oil-tight housing. CLUTCH SIZES— 2½ in. face x 21¼ dia. Mechanical internal expanding. BRAKE SIZES— 3 in. face x 25 in. dia. FAIR LEADS— Full Swivel - brass bushed steel sheaves 6 ft. of cable lead from fairleads to drum - house lock - large outside band brake. LINE SPEED— 180 ft. per minute. ROTATING SPEED— 7 R. P. M.

FEATURES:— ●Power smooth safety boom hoist with "inching" load accuracy. ●Large diameter internal expanding clutch eliminates boosters and troublesome controls. ●16 in., wide groove steel point sheaves. ●8 ft. tail swing. ●All drums, clutches, main drive gears, etc. interchangeable. ●Power unit is Minneapolis - Moline Model 283-4A a slow speed, powerful, rugged unit. ●Live Boom - Lift, swing, and boom up or down at same time. ●Vertical swing pinion replaced without displacing anything on the rotating deck. ●Fairlead sheave swivel adds cable life. ●Position of A Frame assembly and power plant back of the circle provides gross weight counter balance enabling Little Giant to handle heavier loads with greater safety. ●Greater capacity with additional boom length.



Regular Price over \$8000.00

**SPECIAL —
\$5950.00**

2 UNITS F. O. B. PUEBLO, COLORADO
3 UNITS F. O. B. DES MOINES, IOWA

Little Giant balance perfection is accomplished with this new large diameter turntable gear and rotating frame turning on 358-1" steel balls. . . This (patent applied for) feature eliminates the troublesome center pin, lowers the center of gravity by several inches, and allows the machine to easily swing loaded up-grade.

BERNSTEIN BROTHERS
PUEBLO, COLORADO

face any more than is absolutely necessary. The reason for this is that the compaction gained under traffic is far greater than that gained by ordinary rolling methods. Hence, greater carrying power or stability is obtained.

Macadam with oiled surfaces, penetration-macadam mixed tops, etc., require re-oiling to seal the surfaces and to rejuvenate the binders used. It is not advisable to wait until there is a porous or thread-bare appearance before surface treatment. These conditions, when permitted to exist, produce raveling.

There are two schools of thought in regard to surface treatment. One favors a fairly heavy application of oil and the other a more frequent light application. If a surface has been neglected and a porous condition exists, then the heavy application is necessary. Onondaga County prefers the preventive measures, said Mr. Traver, and treats more often with about 0.15 to 0.2 gallon per square yard. Repeated use of the heavy applications, he said, is apt to produce a soft mulch on the surface, which does not add to the carrying capacity of the road and is quite apt to move or creep under heavy traffic.

All of the various types require patching at intervals. But except where foundation failures occur, surface patching should be a small item if the roadway itself is properly maintained by surface treatment. Raveling or pot-holes are a sure indication of lack of binder through neglect. Porous pavements permit the entrance of moisture, and, in frost country, the top course may be pried loose by frost action.

To patch these places, an aggregate similar to the surface should be used. Where foundation failure is evident, an area much larger than the break should be opened down to the subgrade and the fault corrected at that point. Nothing is accomplished by repairing just the evidence of failure on the surface. If this is done, there will be two holes to patch the next year instead of the one patched the previous year.

Fortunately, much has been done in many states to eliminate foundation troubles, Mr. Traver pointed out. Soils bureaus have been established in many of the departments. Thorough studies are made of the various soil conditions on a job and corrective measures are provided in the design. Elimination of too-extravagant construction has resulted in a few instances, and poor soils have been corrected when encountered.

This latter operation, especially, has resulted in great reductions in maintenance costs. Unfortunately, some of the states do not take the fullest advantage of their studies and recommendations.

There is an old adage that "A stitch in time saves nine", Mr. Traver said in closing. It is well worth remembering in highway maintenance and will save money.

Plow, Grader Blades For Truck Mounting

A new reversible snow-plow blade featuring complete hydraulic control is being shown at the ARBA Road Show by the Willett Mfg. Co. of Grand Rapids, Mich. According to the manufacturer, the cutting angle of the blade can be controlled at all times from the cab of the truck on which the plow is mounted. The plow swings through an arc of 70 degrees, with six different positions available. A power-locking device is designed to hold the blade in



Among the new equipment on display at the ARBA Road Show in Chicago this month are the new Willett hydraulically controlled reversible snow-plow, and the Model HRT underbody blade—both shown here mounted on an FWD truck.

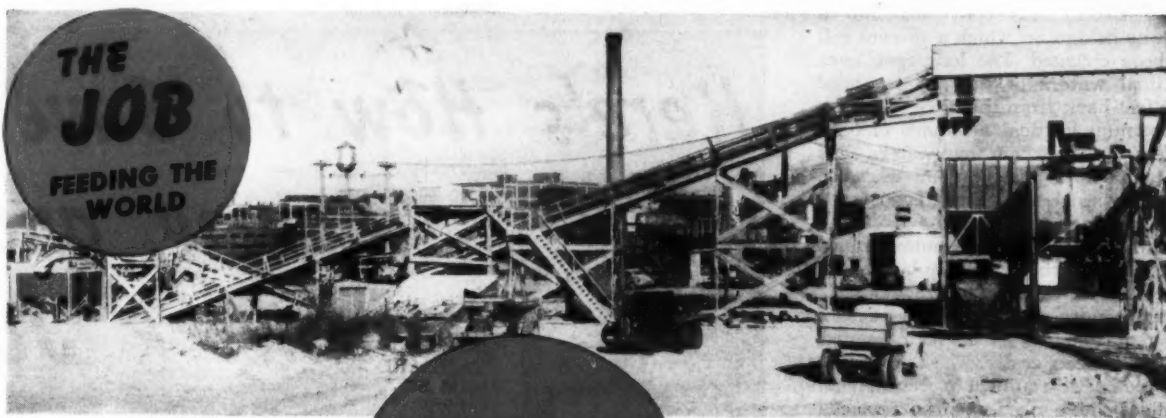
position once it is set.

Other features are adjustable trip-blade action, and adjustable pitch of the moldboard, either forward or back. The plow has spring-cushion skid-type shoes, and the entire unit is said to be easily demountable.

The company also manufactures a grader attachment which can be oper-

ated by the same power-driven hydraulic pump as is used for the plow. Features claimed for the improved Model HRT grader include a power-locking device, adjustable tilt of the moldboard, and a 15-inch road clearance.

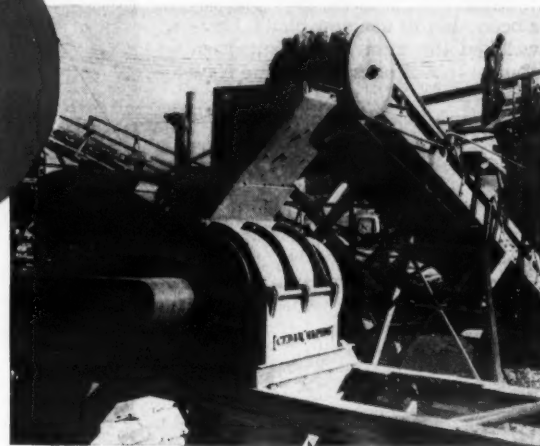
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 97.



THE EQUIPMENT
CEDARAPIDS
HAMMERMILLS

THE CONTRACTOR

CONCRETE MATERIALS
& CONSTRUCTION CO.
Cedar Rapids, Iowa



Self-Loading Floats

GET THE JOB DONE with LESS Labor, Equipment, Time!

Loading and unloading heavy machinery is made easy with the HOBBS Self-Loading Float. Can be lowered into easy grade ramp position with truck winch—loading and unloading then simple as illustrated by top photo (or by using truck winch line with truck backed up to rear of float.) Single and tandem axle models.

WRITE FOR FOLDER SLF

HOBBS MANUFACTURING CO.
Dept. N, 609 North Main St. Fort Worth, Texas
Factory Sales and Service Also in
Houston San Antonio Dallas Lubbock

Millions of acres of corn and wheat land owe their productivity to the more than a million-tons-a-year production of agricultural limestone by Concrete Materials & Construction Company, one of the largest producers in the country. In addition, every year two and a half million tons—and more—of aggregate are produced by the fourteen plants operated by this company and used to build farm-to-market roads to speed produce to a hungry world.

Such a volume of production requires high capacity, efficient machinery that will operate long hours with minimum maintenance and at low cost. That's why so much Cedarapids equipment, ranging from complete portable plants to individual crushers, is used by Concrete Materials & Construction Company. For example, a Cedarapids Hammermill in their Otis plant will produce more than 40 tons of agstone per hour. One of their Unitized plants has passed its fifth million ton of crushed stone production. Other units have equally impressive records.

When you buy aggregate producing equipment, follow the leaders who know and buy the best—buy Cedarapids.

THE IOWA LINE of Material Handling Equipment Includes—

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS—STEEL BINS
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VIBRATOR AND REVOLVING
SCREENS
FEEDERS—TRAPS
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GRAVEL PLANTS
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TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

Cedarapids

Built by
IOWA



IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Concrete Piers Built For New Toll Bridge

**Will Replace a Narrow
Timber Trestle Over Bay;
Steel Superstructure to
Include Bascule Span**

THE short stretch of New Hampshire fronting on the Atlantic coast is a popular summer resort well known for its many beaches. State Route 1A which runs along this coastal strip is a heavily traveled road on which there exists a troublesome bottleneck: a 20-foot-wide timber trestle that crosses the broad expanse of Hampton Bay just south of Hampton Beach.

When this bridge was built back at the turn of the century by a now-defunct electric-railway company, it was the longest of its type in the country. As the electric car gave way to the motor car, the line was abandoned, and the timber trestle was converted into a highway bridge on which a 15-cent toll has been charged. The long span over the tidal waters of the bay is about 1,000 feet back from the ocean, and has a maximum vertical clearance of only 17 feet above mean low water. This means that its bascule span must be constantly raised to permit even small boats to enter or leave the bay. The resultant bottleneck to motor traffic, backed up on the trestle or beyond, is obvious.

Furthermore, the all-wood structure has required continual maintenance, which has been costly. The timber pile bents, constantly subject to erosion from the tides, have needed to be replaced often, while the wooden deck has always been able to use new plank. Having weighed the many shortcomings of the 48-year-old timber trestle, the New Hampshire State Highway Department is now replacing it with a modern highway bridge which will cost over \$1,000,000 to construct.

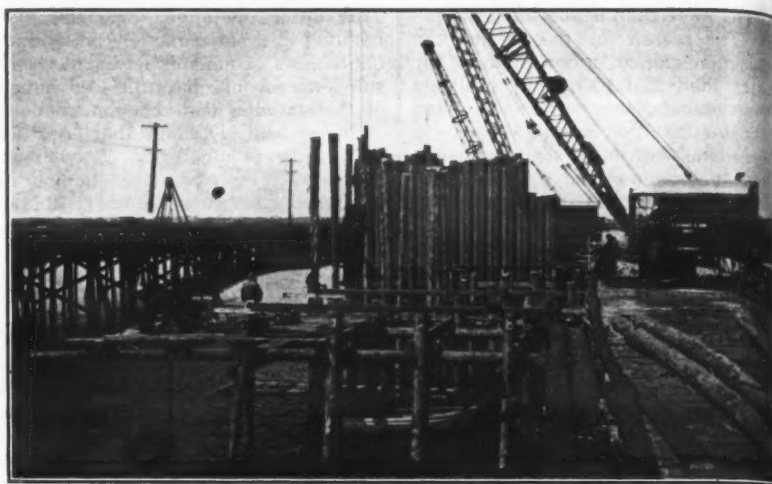
The substructure, consisting of twelve piers and two abutments, is now being built by T. Stuart & Son Co., of Watertown, Mass., at a contract price of \$560,360. The steel superstructure, which includes a bascule span, will be furnished and erected by the Phoenix Bridge Corp. of Phoenixville, Pa., which

was awarded the contract on its low bid of \$514,868.

Hampton Harbor Bridge

The substructure of the new Hampton Harbor Bridge was begun in April, 1947. Before winter halted operations, the two abutments and eight of the piers were completed. The three remaining piers that will support the bascule span and one flanking pier, were scheduled to be finished by mid-July. The steel for the superstructure is scheduled to be delivered and erected during the summer, so that the new bridge can be completed and opened to traffic by the end of the year.

The new structure is located 101 feet east of the old timber trestle, center-line measurement, so traffic will con-



New Hampshire Highway Dept. Photo

Here T. Stuart & Son Co. drives sheet piling for the north pier of a new bridge across Hampton Bay to replace an old timber trestle.

tinue on the old span until the new one is completed. The thirteen spans making up the bridge have a total length of

1,193 feet, center-to-center of abutment bearings. The 65-foot bascule span is the longest of its kind in the country. (Continued on next page)

Here's How to Save Money On Paving and Patchwork Jobs!

The new Wayer Impactor, Model A-25, weighs only 230 lbs., but delivers more impaction than a 10 ton roller. No other piece of paving equipment is so versatile and has so many applications as the Wayer Impactor.

Highway engineers and contractors know that "impaction" is much more satisfactory than "compaction." Instead of compacting the material in the manner of a roller, the Wayer Impactor actually irons in the material while tamping to obtain a velvety finished surface. The result is an installation of tremendous density. Furthermore, the Wayer Impactor can be operated around manholes, in gutters, against walls and in other places where a roller is impractical.

The engine exhaust supplies heat to the finishing plate of the Wayer Impactor, preventing the plate from sticking to asphalt. It will travel 35 to 40 feet per minute, operating on about 1½ gallons of gasoline per day.

Counterweights provide impaction of 805 lbs., 1750 to 2000 times per minute, while roller bearings and rubber mountings minimize vibration to the operator.

Why not inquire into the advantages of the Wayer Impactor for your next patching or paving job? You can use it in state highway road repair, driveways, city street maintenance, railroad crossings, tamping earth or gravel and airport runways. This new, versatile machine will save you both money and time. Write today for an illustrated folder on the Wayer Impactor.

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WE MAKE for All Types of EQUIPMENT

Highest Quality
Cutting Blades for

- ROAD GRADERS
- DRAGS
- LOADERS
- MAINTAINERS

and

- SNOW PLOWS

Also

ROAD TORCHES
STREET AND
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**BEACH MANUFACTURING
COMPANY**

CHARLOTTE, MICHIGAN

Wayer

IMPACTOR, INC.

12 NORTH 3rd STREET

COLUMBUS 15, OHIO



C. & E. M. Photo

To build the piers of the Hampton Harbor Bridge, a timber work trestle was constructed from each bank. Here it is being extended. Out at the end of the trestle, a McKiernan-Terry 9B2 hammer swung from the 65-foot boom of a Lima crane drives timber piles.

span is at the center of the bridge, while the six other spans on each side are 94 feet long. The single-leaf bascule hinges on the north pier which is numbered 1-N. The south bascule rest pier is 1-S, while the others are designated 2-S, 3-S, 4-S, 5-S, and 6-S in the direction of the abutment. On the north half of the bridge the piers were numbered in like manner from 1-N to 6-N, from the center of the bridge to the shore.

The U-shaped abutments and the rectangular piers are of reinforced concrete. The piers are faced with granite and, except for three, all those completed are supported on creosoted-timber piling. Under piers 2-N, 4-N, and 6-N are strata of ledge rock which did away with the piles. The piers vary in height from 21 to 40 feet above the footings, with the highest piers at the bascule span. When the span is closed, the vertical clearance above mean low water will be 27 feet. This will permit the passage of many small boats without having to raise the bascule leaf. Such, of course, is not the case with the old bridge.

Designed for H-15 loading, the steel superstructure will have a 9 $\frac{3}{4}$ -inch concrete deck with a 26-foot clear roadway and a 4-foot walk on one side. At the bascule span the deck will be an open steel grid. Tolls will also be collected on the new bridge.

Construction Trestle

To build the new piers, a timber work trestle was constructed from each bank. From the north shore, the temporary trestle extended out to include pier 2-N. The trestle built out in the harbor from the south shore served the remainder of the piers including 1-N. In this way the existing channel, through the movable span at the old bridge, was kept open, and navigation was not hampered by the construction operations. The work trestle was just east of the line of the new bridge.

The work trestle consisted of pile bents on 21-foot centers. The deep-water bents contained 8 piles, and those in shallower water only 6 piles. Piles with 8-inch tips and from 12 to 14-inch butts were used, having lengths up to 60 feet. The bents were capped with 12 x 12's, across which were laid five 12-inch H-beams as stringers. Underneath, the bents were cross-braced with 4 x 12's. The 16-foot-wide deck was made up of 4-inch planking, with wheel guards along the edges and a catwalk at one side. At each pier a 24 x 28-foot work platform jutted out from the trestle. These platforms held the men, materials, and machines needed in the construction at that particular pier. Their use permitted the work trestle itself to be kept clear and open for deliveries.

Carried on the trestle were a 1 $\frac{1}{2}$ -inch water line and a 3-inch air line. Water was needed at the piers for cleaning and flushing the forms, cleaning the

concrete after a pour, and for curing the concrete with wet burlap. For the north half of the project the water was tapped off a Hampton Beach main. On the south side three wellpoints stuck in the ground furnished an ample supply of water.

Three Ingersoll-Rand 500-cfm compressors on the shore pumped air into a 4 x 20-foot cylindrical receiver which was hooked up to the pipe line carried on the work bridge. A couple of other I-R compressors, 210-cfm units, were also on the job for stand-bys or miscellaneous work. Compressed air was employed for driving piles, operating pneumatic saws and vibrators, and general clean-up work.

Sheet-Pile Cofferdams

Except for a small area of ledge rock on the north side, the harbor bottom has a substratum of sand. From the trestle and work platforms, steel sheet-pile cofferdams were driven as the first step in the construction of the piers.

(Continued on next page)

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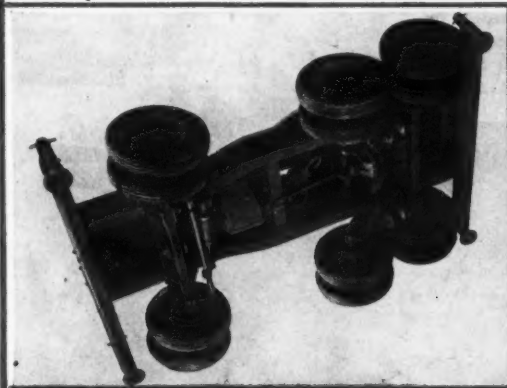
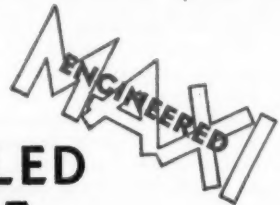
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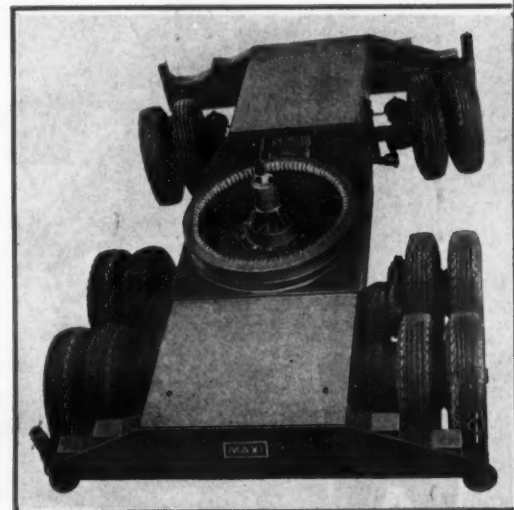
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C. & E. M. Photo

Here you are looking into the cofferdam for the south abutment of the new Hampton Harbor Bridge.

Concrete Piers Built For New Toll Bridge

(Continued from preceding page)

The sheeting was a Bethlehem DP-2 section, $\frac{3}{8}$ inch thick and from 32 to 60 feet long. A McKiernan-Terry 7B hammer operating on compressed air did the driving. Four cranes were available for handling the hammers—2 Limas and a Bucyrus-Erie with 65-foot booms, and a Manitowoc Speedcrane with a 100-foot boom. The bottom of the sheeting was driven to a depth of at least 10 feet below the bottom of any excavation line. The tops were left at elevation 17, and the inside timber bracing was placed to an elevation of or near mean low water.

Clamshell buckets of 1-yard capacity then excavated within the enclosed sheeting, dumping the material out around the sides. The digging was usually carried down to a foot below grade to make sure that the concrete seal reached the intended level. Then the rest of the inside bracing was installed to complete the cofferdam.

The lowest ring of bracing consisted of 12-inch steel H-beams around the sides, cross-braced with two 12 x 12's running longitudinally and three 12 x 12's in a transverse direction. The next two rangings above that, on about 7-foot vertical centers, were 12 x 12 construction throughout. After the seal was poured, the lowest set was raised to make room for the footing pour.

With the bracing in place, a checker-board of guide timbers was laid out on top of the cross members to serve as a template for driving the creosoted-timber bearing piles. All but the three piers resting on ledge are supported on these piles which are driven on an average of 3-foot centers both ways. The piles are from 20 to 40 feet long with 8-inch tips and 12-inch butts. They were driven by a McKiernan-Terry 9B2 hammer working off compressed air. This hammer also drove the piles for the work trestle. The creosoted piles were obtained from the treating plant of Koppers, Inc., at Nashua, N. H., and were hauled by truck and trailer to the job site. The contractor's truck crane ran the piles out on the work trestle where the cranes took over.

The piles were driven to such a grade that they extended through the plain concrete of the seal 6 inches into the footing, in the case of the smaller piers. This underwater seal varies from $3\frac{1}{2}$ to 12 feet deep, according to the depth



C. & E. M. Photo

The seal has been poured and the piles cut off in the cofferdam for pier 3-S of the Hampton Harbor Bridge. Four Gorman-Rupp pumps, 3, 6, and 8-inch, are unwatering the cofferdam in order that the footing can be poured.

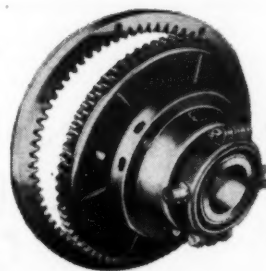
of the footings. At the larger piers where the piles do not protrude above the seal, divers went down into the cofferdams and cut the piles off at a point 5 feet above the bottom grade of the concrete, using both hand and pneumatic saws.

Concrete Batch Plant

A concrete batch plant was set up on a siding in the yards of the B. & M. Railroad at Hampton, about 5 miles from the bridge. Sand and washed gravel for the aggregate was supplied by the Manchester Sand & Gravel Co. of Hooksett, N. H. It was shipped by rail to the siding, where it was unloaded by a Manitowoc Speedcrane with a 70-foot boom and a Mead-Morrison 1-yard clamshell bucket. The material was either stockpiled or loaded into a Blaw-Knox 30-yard 3-compartment aggregate bin.

Next to the aggregate bin was a Blaw-Knox 300-barrel cement bin which was supplied with bulk cement—

(Continued on next page)



Model CL Clutch

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Twin Disc Friction Clutches are available in one, two and three-plate construction. Sizes range from 5.5" up to 42", with capacities from 12 hp to 875 hp. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

Forward and reverse movement of this 12-ton Galion three-wheel road roller is accomplished through two Twin Disc double-plate friction clutches. The master clutch on this model is also Twin Disc.



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Model TOYS

THE CHARLES W.M. DOEPKE MFG. CO. ROSSMOYNE, OHIO



C. & E. M. Photo
These Blaw-Knox cement and aggregate bins were set up for the New Hampshire bridge job on a siding of the B. & M. RR. Beyond them is a Manitowoc Speedcrane with a Mead-Morrison 1-yard clamshell bucket.

Lehigh from Alsen, N. Y., and Alpha from Cementon, N. Y. A worm gear beneath the siding track and an enclosed elevator transferred the cement from car to bin. The concrete was mixed in truck-mixers which first backed under the aggregate bin for the sand and gravel, and at the same time got the water which was tapped off a town water main. Then the mixers backed under the adjoining bin for a load of cement.

As many as eight truck-mixers were used at a time on the larger pours. Four of these were Jaeger 3-yard units owned by the contractor and mounted on either Sterling or Autocar trucks. The others were 4-yard Rex models rented by the hour. The mixing time was from 5 to 7 minutes, and mixing usually started when the trucks were about 2 miles from the end of the job. When piers on the north side were being poured, the haul was only 5 miles. To deliver concrete for the piers on the south side, however, a 14-mile haul was necessary. The heavy trucks could not drive over the existing toll-bridge trestle which was posted for only 6-ton loads. Instead they had to go south on U. S. 1 to Salisbury, Mass., and then back north on Route 1A to the south side of the bridge.

The Mix

Two sizes of coarse aggregate, or washed gravel, were used in the mix. The larger size, from 2½-inch down to ¾-inch, comprised about 70 per cent of the gravel; the smaller size, graded from ¾-inch down to No. 4, accounted for the remaining 30 per cent. The weights of a typical 6-bag batch were as follows:

Cement	564 lbs.
Sand	1,045 lbs.
Large gravel	1,645 lbs.
Small gravel	700 lbs.
Water	29 gals.

The gradation of the coarse aggregate and sand was as follows:

Sieve Size	Per Cent Passing	
	Gravel	Sand
2½-inch	100	....
1½-inch	40-75	....
¾-inch	10-30	....
¾-inch	....	100
No. 4	0-5	95-100
No. 16	....	45-80
No. 50	....	5-30
No. 100	....	1-8
No. 200	....	0-3

Form Work and Concrete

The plain-concrete seal was poured as tremie concrete in 2-foot lifts for the bigger piers, and 1-foot lifts for the shallower piers. The truck-mixers backed out on the trestles and discharged the concrete into Blaw-Knox 1-yard buckets of which there were four on the job. When a seal below the level of the piles was being poured, the concrete buckets were emptied into a hopper which had a 12-inch tremie pipe at the bottom. At the end of the pipe was a gate or trap which was controlled from the crane supporting the pipe. Above the top of the piles the underwater placing was done with a bottom-dump bucket.

A week after the seal was poured, the

water was pumped out of the cofferdam and the laitance was cleaned off the top of the concrete. Big 4 to 8-inch pumps were provided for unwatering the cofferdams—either Gorman-Rupp, Rex, or Lawrence. About 10 such pumps were available.

Inside the now-dry cofferdams the form work took shape for the footings and then the piers. Prefabricated panels were constructed with 1-inch lumber backed by 2 x 4 studs on 16-inch centers, and with double 3 x 6 wales on 30-inch centers. The opposite form panels were tied together with Richmond Tyscrus on an average of 30-inch centers both ways. Above the seal the structure was reinforced with steel furnished by the Bethlehem Steel Co. which made delivery from its Boston, Mass., plant.



C. & E. M. Photo
Looking south across the new bridge at Hampton Harbor, we see the work trestle extending from the opposite shore. The granite facing on the piers is also clearly visible.

Masonry-Faced Piers

Granite for the pier facings was furnished by the H. E. Fletcher Co. quarry

at Chelmsford, Mass., and shipped by rail to the plant siding. From there it (Concluded on next page)



a full house
FROM 6" TO 36" SHEAVES

OF
CONSTRUCTION BLOCKS

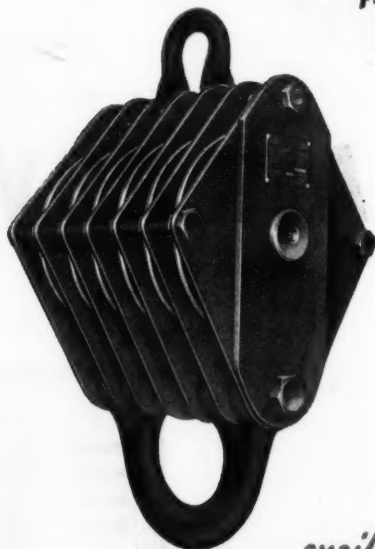
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Concrete Piers Built For New Toll Bridge

(Continued from preceding page)

was trucked to the job. The facing starts at minus 2 elevation and continues to the top of the piers, which are surmounted by a concrete cap 1 foot 3 inches deep and overhanging the masonry by 3 inches. No wooden forms were needed where there was masonry. The granite was set first to serve as a form for the concrete. As the concrete was placed, the blocks of stone were tied in to the mix with $\frac{3}{4}$ -inch anchors known as "dogs". From 8 to 12-inch-thick blocks of granite were used, with the average about 10 inches. If the block was under 5 feet in length, 2 anchors were used to make the tie with the concrete; for blocks over 5 feet long, 3 anchors were required.

The height of the masonry blocks is 2 feet, and the concrete was placed in lifts that high, thereby eliminating the need for bracing. With this procedure, pours were conducted on more than one pier at a time. On occasion three piers were being concreted at once. Cranes swung the concrete buckets over the forms, and as the concrete was discharged it was vibrated by either Ingersoll-Rand or Chicago Pneumatic vibrators.

Where no bearing piles were driven under a pier because of the presence of ledge rock, the sheet piling was left in place. However, divers burned off the steel on a line 1 foot above the top of the concrete footings. At the other piers the sheeting was removed by a McKiernan-Terry extractor.

The deepest piers are 1-N, 1-S, and 2-S out in the channel, which go down to minus 30 elevation at the bottom of their 12-foot seals. Above the seals the footings are $3\frac{1}{2}$ to 4 feet thick, and vary in size from 34 to 41 feet long, and from 14 to 17 feet wide. Pier 1-N on which the bascule hinges is an exception. It is supported on 144 piles. And it has the largest continuous pour of 785 cubic yards of concrete in its seal, with a footing above that of 57 feet 5 inches x 26 feet 9 inches. The average size of the other piers is 29 feet long x $5\frac{1}{2}$ feet wide with vertical sides.

The superstructure will consist of two 6-foot $8\frac{1}{2}$ -inch-deep deck plate girders connected by floor beams—21-inch WF 103-pound, or 27-inch WF 91-pound. The concrete floor slab will be $9\frac{3}{4}$ inches thick. The girders will have four 3-span continuous units plus the bascule span. The structural steel in the superstructure will total 1,570,000 pounds—210,000 pounds of it in the bascule span, and the remainder over the other 12 spans.

Quantities and Personnel

The major items in the substructure contract include the following:

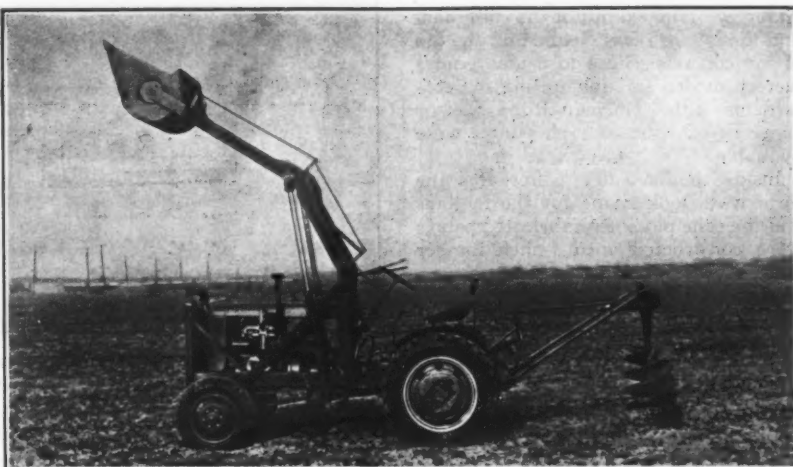
Steel sheet piling left in place	5,720 sq. ft.
Timber bearing piles	29,080 lin. ft.
Concrete	6,146 cu. yds.
Reinforcing steel	196,000 lbs.
Granite masonry	15,670 cu. ft.

For T. Stuart & Son Co., Hubert F. Powell is General Superintendent, and Edward F. Pulaski is Engineer. Roger Downing is Resident Engineer for the New Hampshire State Highway Department. The Department is headed by Frederic E. Everett, Commissioner, with D. H. Dickinson as Chief Engineer. H. E. Langley is Bridge Engineer, assisted by F. M. Auer.

Tractor Attachments

Accessories for use with the J. I. Case Model VAI tractor are made by the Construction Products Corp., 4345 E. Imperial Highway, Lynwood, Calif. They include a front-end loader, power-operated earth auger, angle dozer blade, angle grader, and earth scoop.

The Profit loader features a dumping height of 8 feet 6 inches, and a $\frac{3}{8}$ -cubic-



Companion tools made by Construction Products Corp. for the Case VAI tractor include this front-end Profit Loader and power-operated earth auger.

yard bucket, struck capacity. The angle grader blade is 72 inches wide, and 18 inches deep. The auger is designed to dig holes with diameters up to 18 inches,

to depths of 36 inches. The hydraulic cylinder operating the auger is said to exert downward pressures of over 5,000 pounds. Feature of the earth scoop is

the hydraulic "down" pressure which helps it to take a full bite each time. The scoop has an 11-cubic-foot capacity. All rear-mounted attachments are operated from a common rear-equipment hitch. The front-mounted attachments are hydraulically controlled.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 54.

B-E Buys Hydro-Crane

Bucyrus-Erie Co., South Milwaukee, Wis., has purchased the Milwaukee Hydraulics Corp. It has acquired the drawings, designs, and patent rights for manufacture of the Hydro-Crane, a truck-mounted hydraulically operated crane.

Don Smith, Sales Manager of Milwaukee Hydraulics, has joined Bucyrus-Erie and will continue in the same capacity in charge of the Hydro-Crane Division. The Hydro-Crane plant is located at 7923 W. Greenfield Ave., Milwaukee, Wis.

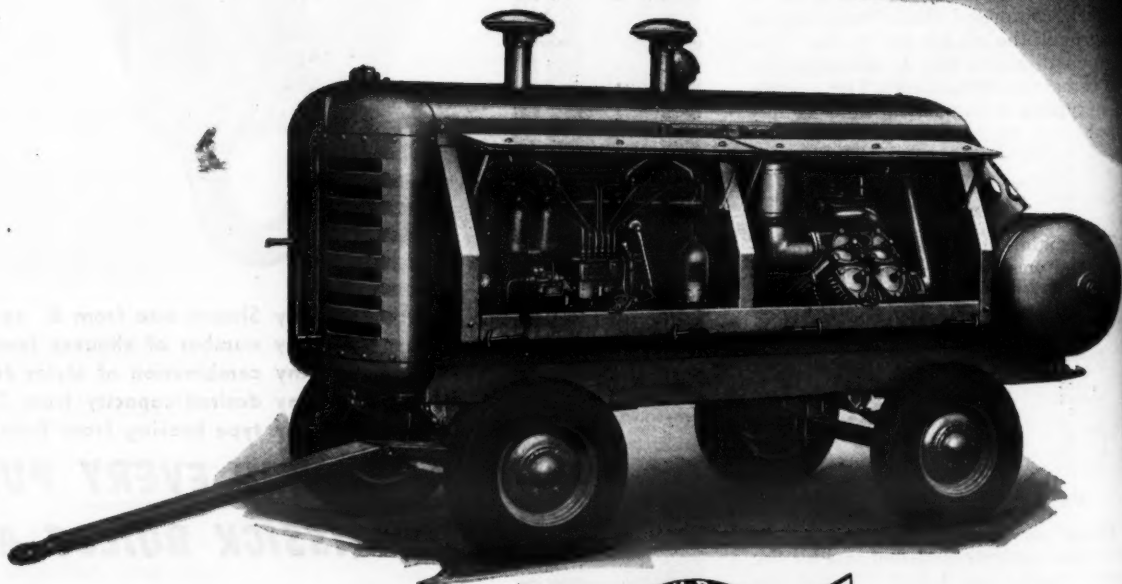
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Be sure to see the new QUARRYMASTER

Pusher, Dozer Unit Has Electric Control

A 300-hp 4-wheeled rubber-tired dozer unit has been introduced by R. G. LeTourneau, Inc., Peoria, Ill. A feature claimed for the Model B Tournadozer is its electrically operated blade, controlled by a 240-volt 120-cycle ac Tournatorque electric motor working through a gear-reduction box. The motor brake, built as an integral part of the motor assembly, is designed to lock the blade in the desired position upon the release of the blade-control switch. The spring-loaded multiple-disk brake unit is released automatically by electro magnets as the hoist motor is operated. The motor is reversible, and is controlled by a fingertip switch located near the operator's right hand.

Source of the electric current is a generator built in line with the diesel engine. This generator delivers power directly to the blade-control motor through magnetic contact switches. A



Here is LeTourneau's new 25-ton 300-hp Model B Tournadozer. Electric blade control is provided by a 240-volt 120-cycle ac Tournatorque electric motor.

revolving field with low voltage to the brushes is said to reduce arcing and loss of power. A current transformer delivers low-voltage current directly to the brushes in proportion to the current drawn by the hoist motor. Thus, the generator output increases as the demand for current at the motor increases, the manufacturer points out.

A battery-charging system drawing

power from the ac generator eliminates the need for a dc generator and voltage regulator. The system has no moving parts to wear, and is said to maintain storage batteries at the proper charge level.

The Tournamatic transmission is designed to do away with gear shifting. And it provides a selection of four forward or reverse speeds. Top speed in

either direction is 13.6 mph. Six multiple-disk clutches select the desired ratio through a selection lever. Steering clutches, brakes, and transmission clutches are air-actuated.

This 25-ton pusher and dozer unit is mounted on four 24.00 x 29 tapered-bead pneumatic tires. According to the manufacturer, the blade can be lifted 3 feet 10 inches above the ground. Overall width of the unit with the blade mounted is 13 feet 10 inches, length 19 feet 7 inches, wheelbase 7 feet 6 inches, and gage 8 feet 10½ inches. Approximate shipping weight is 50,700 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 107.

Asphalt and Aggregate Are Mixed by Impact

Equipment for combining asphalt and aggregate for asphalt-paving mixes by a new process can be secured from the Asphalt Processes Corp., 55 W. 42nd St., New York 17, N. Y. It is available for lease on a royalty basis, and can be installed in standard asphalt plants. It consists of machinery by which the asphalt is atomized under a pressure of 275-300 pounds and then forced—or impacted—into any conventional aggregate which is kept in motion by rotating blades in the pugmill.

It is claimed that in materials mixed by impact, the bitumen covers as large a surface of the loose aggregate as is possible, and friction is increased between the two elements. This, in turn, prevents the bitumen from flowing freely and causes it to remain in the aggregate even when in a liquid state. Among the other features claimed for bituminous surfaces laid by this process is that they are non-skid, glare-proof, and that they remain stable and level. The method can be used in making bituminous-concrete, bituminous-macadam, or sheet-asphalt pavements.

The following economies are also claimed for this process: it enables the bitumen content to be reduced, it permits the use of higher-penetration asphalts, and mixing operations are conducted at lower temperatures. This method of mixing can be used with any formula, the company points out.

Asphalt Processes also explains that mixes can be transported in non-insulated trucks, and when the temperature remains above 70 degrees, they can be applied for a period of up to 3 days after discharge from the mixer. Hot-mixes which are not used do not have to be discarded, but can be stockpiled indefinitely for future use, it is stated.

Specifically, the equipment consists of a high-pressure pump with an electric motor, pressure gage, relief valves, screens, spray bars with high-pressure nozzles, necessary pipe fittings, and all controls. For cold-mixes, installation of a water spray is required.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 112.

Welding Instruction Books

A folder describing five welding and cutting instruction books has been made available by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. Two of these books are devoted to arc welding, two to oxyacetylene welding and cutting, and the fifth is called a "Manual of Design for Arc Welded Steel Structures".

The folder describes the contents of the books, points out what can be gained by a study of each, and tells its size and its price. An ordering blank is included for those desiring to purchase the books.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 7.

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Rock Salt Employed For Stabilizing Roads

Town Forces Spread It On Bases of Scarified Gravel; Surface Is Then Graded, Raked, Rolled

THE town of Ellicott is one of 27 towns comprising Chautauqua County in western New York State. The Ellicott Town Highway Department has been improving some of its gravel roads recently by stabilizing them with rock salt. The general procedure is first to scarify the usually hard-packed gravel base, spread the salt over the surface, then grade, rake and roll the road. Besides serving to hold the road material together better, the salt also decreases the dust considerably. The average amount of salt required in this stabilization process is 10½ tons per mile on an 18-foot gravel road.

A typical example of this improvement was the reconstruction of a 1-mile stretch along Frederick Boulevard, an 18-foot gravel road lying west of the city of Jamestown. The job was done last summer and stood up well through the autumn and winter. The original road consisted of 8 to 10 inches of gravel which had been shaped and compacted by traffic. However, surface material was constantly being thrown off the road by passing cars, and the dust had become a nuisance to dwellings along the right-of-way.

Done by Town Forces

Ralph L. Cederquist, Town Superintendent of Highways, with a crew of 9 maintenance employees completed all the necessary operations within a week. A Caterpillar No. 12 diesel motor grader equipped with 10 scarifying teeth scarified the surface of the gravel road to a depth of 4 to 5 inches. Although pounded under traffic for 3 years, the gravel loosened up readily as the grader passed up and down the mile-long job.

In the meantime Sterling rock salt had been shipped in bulk by freight cars from the Retsoff, N. Y., mine of the International Salt Co., 150 miles to the New York Central RR siding in Falconer, where the Ellicott Town Highway Department has its headquarters. This year the Town hopes to acquire a conveyor for unloading salt and similar bulk road-building materials, but for this job the salt was unloaded with hand shovels from the car to an Oshkosh truck. For the first operation 6 tons of rock salt was put into the 10-ton truck. The haul to the job was 4 miles.

To the tail-gate of the truck a John Deere lime spreader, 8 feet wide, was attached for spreading the salt. Half the amount required for the total job, or 5¼ tons, was put down in the first application. The spreading was completed in two passes as the truck went down one half the road and back up the other half. Behind the spreader came the motor grader, turning over the surface with its 12-foot blade which worked the salt well down into the gravel. In the process the grader also reshaped the old surface of the road, removing any irregularities.

Then another 5¼ tons of rock salt was distributed over the road in the same manner, as two men stationed in the truck used shovels to keep the spreader box filled. The grader, as before, followed along, turning over the gravel and salt in the shaping routine.

Raking, Rolling, and Rain

When the blading and surface shaping was completed, a York rake was pulled over the road by a Caterpillar Thirty tractor. This rig rolled along on four rubber-tired wheels; it consisted of a

front blade set at a 45-degree angle, behind which was a steel rake, also on a 45-degree angle, but in the opposite direction. With this piece of equipment the large-sized pieces of gravel were thrown off to the side of the road. The surface was then rolled by a Buffalo-Springfield 10-ton 3-wheel roller.

At this point in the construction the road would have been wet down. Arrangements had been made to borrow a water-tank truck from a neighboring town highway department. However, nature cooperated with a shower, which made the mechanical watering unnecessary. Then the rolling was resumed and continued for several hours. The road was left alone for a couple of days, and re-rolled. The wetting of the salted



C. & E. M. Photo

This is Ralph L. Cederquist, Town Superintendent of Highways for Ellicott, N.Y., standing in front of the Department's Ross V-type snow plow.

gravel served to bind the material more closely together. The actual spreading of the salt consumed only 4 hours.

The work crew consisted of a motor-

grader operator, tractor operator, roller operator, truck driver, 2 shovelers with the spreader, 2 flagmen for maintaining traffic throughout all the operations, and a foreman.

Besides this 1-mile stretch of salt stabilization, the Town forces completed another mile of similar work in 1946 covering short sections of road which were in need of improvement. And in 1947, 2 other miles of town roads were scheduled for the rock-salt treatment. The Highway Department has found this method of stabilization to be economical and quick and easy to perform, besides eliminating road dust.

Town Road System

The town of Ellicott covers about 36 square miles, and has a population of 8,041, according to the 1940 census. Its Highway Department maintains 46 miles of town roads; of these, 7 are black-topped, 36 are gravel, and only 3 miles are dirt. They average from 16

(Concluded on next page)

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to 18 feet wide.

Maintenance headquarters are in a 36 x 90-foot wood shop-garage located on the outskirts of Falconer. One end of this building is partitioned off as a machine shop where minor repairs are made on Town-owned equipment. This room is heated by a stove and is equipped with workbench, vises, small tools. It also contains such power tools as a 2 x 28-inch grindstone, a Stanley bench grinder, and a Van Dorn ½-inch electric drill. Equipment is lubricated with a Balcrank grease gun, and the various units are fueled from a gas pump located just outside the building. Water is obtained from a well under the garage.

Town equipment available for highway maintenance includes the following:

- 1 Caterpillar No. 12 diesel motor grader
- 1 Caterpillar Thirty tractor
- 1 Oshkosh 10-ton diesel truck
- 1 Oshkosh 4-ton truck
- 1 International 4-ton truck
- 1 International 1½-ton truck
- 1 Ford 1½-ton truck
- 1 Allis-Chalmers mower
- 1 Buffalo-Springfield 10-ton, 3-wheel roller
- 1 John Deere lime spreader
- 1 York rake
- 1 Mead 25-ton trailer
- 1 Bucyrus-Erie ¾-yard shovel
- 3 V-type snow plows—2 Frinks and 1 Ross

Of the 3 V-type snow plows, the Ross is used with the Oshkosh 10-ton truck, while the Frinks are attached to the 4-ton Oshkosh and International trucks. The motor grader is also fitted out with a Caterpillar plow for snow work.

During 1946-47 the Town used 4 car-loads of cinders to spread on the roads for ice control. They were obtained from the yards of the Erie RR at Salamanca, 45 miles east of Falconer, and were stockpiled in the yard near the garage. To keep the pile from freezing, rock salt was mixed in with the cinders at the rate of 1 ton of salt for every car-load of cinders. When needed, the cinders were loaded into trucks by the ¾-yard shovel, and distributed on the icy road with a sand spreader furnished by the County Highway Department.

Funds

In 1946 the Town Highway Department operated on a budget of \$35,000, which was increased in 1947 to \$50,000. This money is derived from the town's general assessment. In addition, in 1946 the town was helped with state aid to the extent of \$1,600.

In the not-too-distant future the town expects to float a bond issue to supply funds for the construction of a new 60 x 100-foot cinder-block building to be the headquarters of the Highway Department. The present shop and garage facilities are inadequate, but they will be used until the new structure materializes. Across the street from the present wooden building 7 lots have been purchased as a site for the new garage. New shop equipment will also be purchased to equip the building with such units as an air compressor, battery charger, welding machine, and other essential tools.

All construction and maintenance operations of the Ellicott Town Highway Department are under the direction of Superintendent Ralph L. Cederquist.

Guide to Form Work

A guide to concrete form work has been issued by Richmond Screw Anchor Co., Inc., 838 Liberty Ave., Brooklyn 8, N. Y. The 32-page booklet lists the complete line of Richmond Tyscrus, anchors, and supports, and explains the various engineering services made available by Richmond.

The catalog illustrates and describes the Richmond ties, and lists recommended uses. It tells their capacities and weights, and compares them with

other types of form accessories. It also provides information on breakdown of monoliths, preliminary considerations influencing design, concrete pressures, classes of form work, design of form members, selection of tie and anchorage units, placement of concrete, vibration, form stripping, etc. Charts present data on loads and their effects on forms and design considerations.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 13.

Richard Jordan Dies

Dick Jordan, Vice President of Sales since 1945 for Sterling Wheelbarrow Co. of Milwaukee, died last April, after 30 years of service to the company. He started with Sterling in 1918 as Boston District Manager, was promoted in 1921 to the home offices and then made Assistant Sales Manager, and became Sales Manager of the company in 1931—the position he held until his appointment to a vice presidency in 1945.

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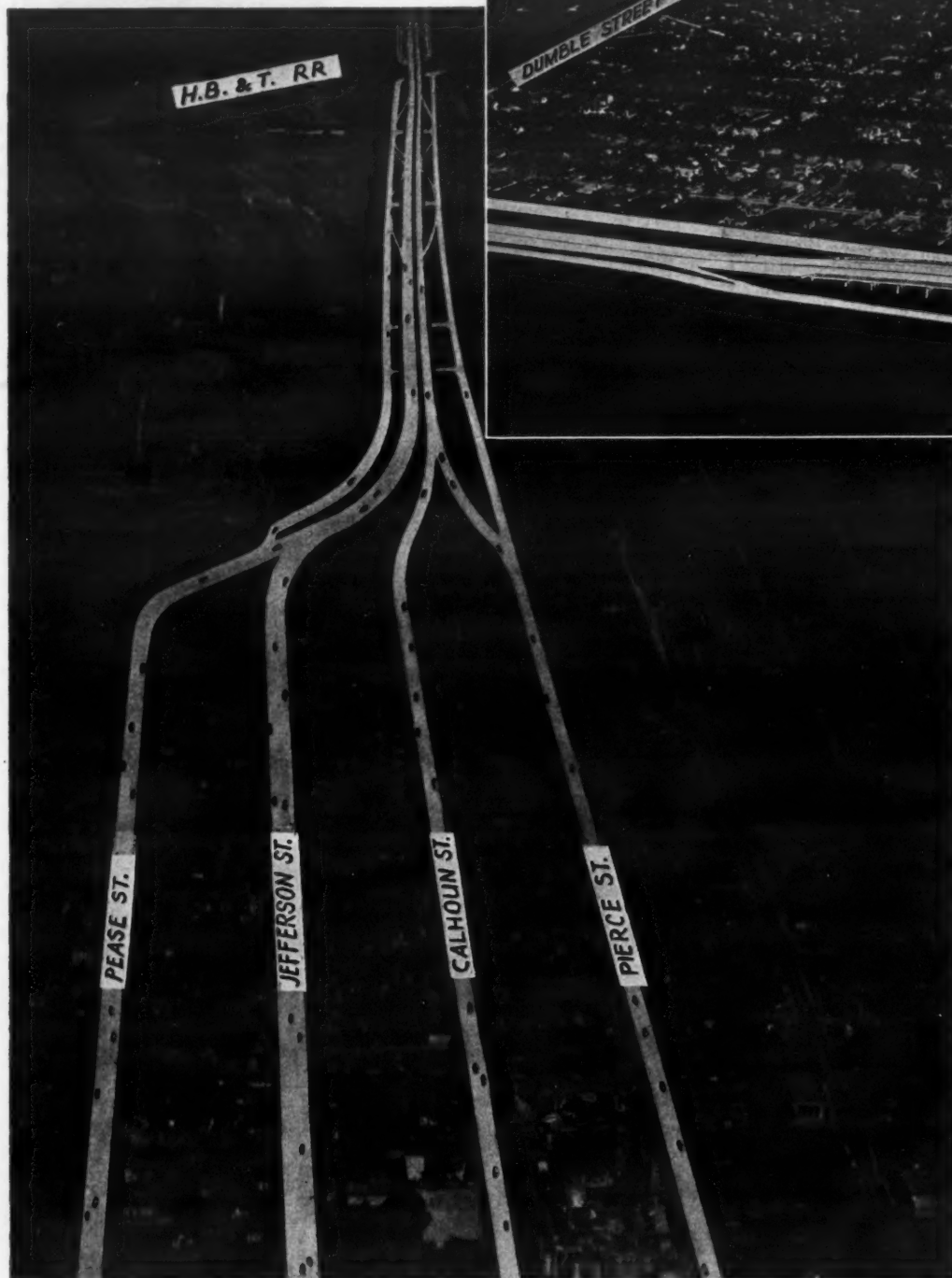
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NORTHWEST END. Traffic will enter and leave the six 12-foot-wide lanes of the Houston Expressway by four feeder streets near the Houston business district (photo below). These are being widened to 54 feet with concrete, then leveled and topped with hot-mix asphaltic concrete, by Brown & Root, Inc., prime contractor on the job. The new expressway crosses three railroads and four principal streets on specially designed overpasses. The one shown in the photo at right is the H. B. & T. railroad overpass.



Houston Urban Designed Vehicle

(Texas State Highway Department and C. & E. M.)

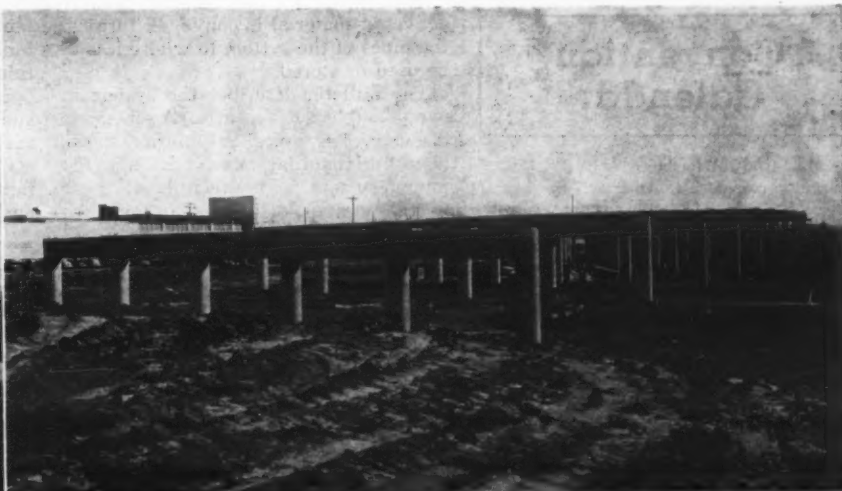
**Fast-Growing Texas City
Builds 4½ Miles of Modern
Highway and Feeder System
To Handle Inter-City Traffic**



ASPHALT PLANT. For its 1.06 miles of asphalt resurfacing on the expressway feeder streets, Brown & Root used this permanent asphalt plant about 2 miles east of Houston's downtown section. It consists of a Standard 4,000-pound pugmill and elevators, a Simplicity drier, and a set of Symons screens. It turned out about 500 tons a day top performance on the expressway project.



CONCRETE PAVING. This Koehring 34-E Twinbatch paver placed expressway and service-road concrete. It is followed here by a Jaeger-Lakewood spreader and finishing machine, and a Koehring Longitudinal Finisher. The ½-inch wood expansion joints shown in the photo occur every 20 feet. This part of Brown & Root's \$6,000,000 contract is scheduled for completion by August.



OVERPASS PIERS. The concrete pedestal-type foundation piers for the expressway overpasses are formed in these steps: (1) 30-inch holes are drilled about 25 feet down to bearing clay, and under-reamed, using a special rig developed by Jack McKinney, a Texas foundation-drilling contractor; (2) prefabricated cages of steel reinforcement are lowered into the holes and the concrete is poured without form work; (3) then, for the concrete work on exposed columns, a cylindrical steel shell is set over the steel reinforcing to perfect alignment (photo at left) and the concrete is poured. Finished columns with the long beams across their tops are shown in the photo above. The accuracy of their alignment is attested if you look down the rows of columns lengthwise, crosswise, or diagonally. Not one is out of line to the eye.

Urban Expressway and for 70,000 Miles a Day

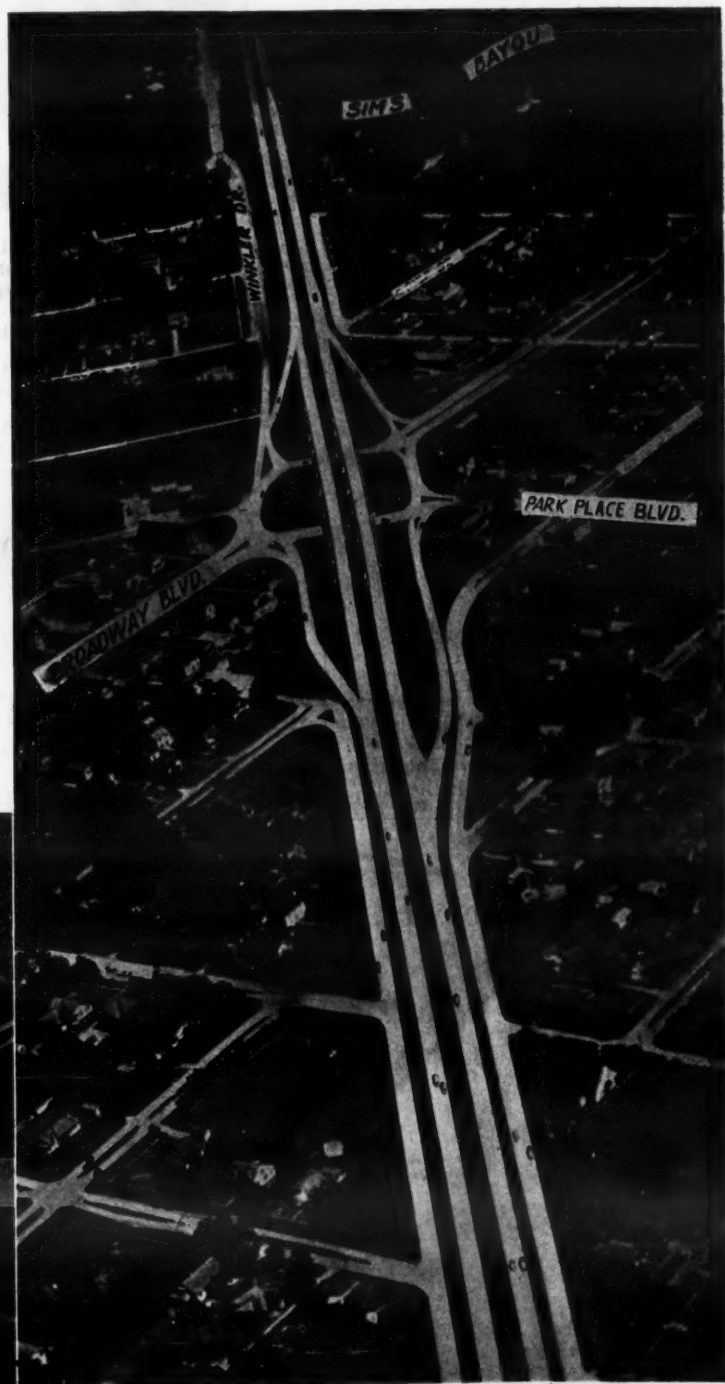
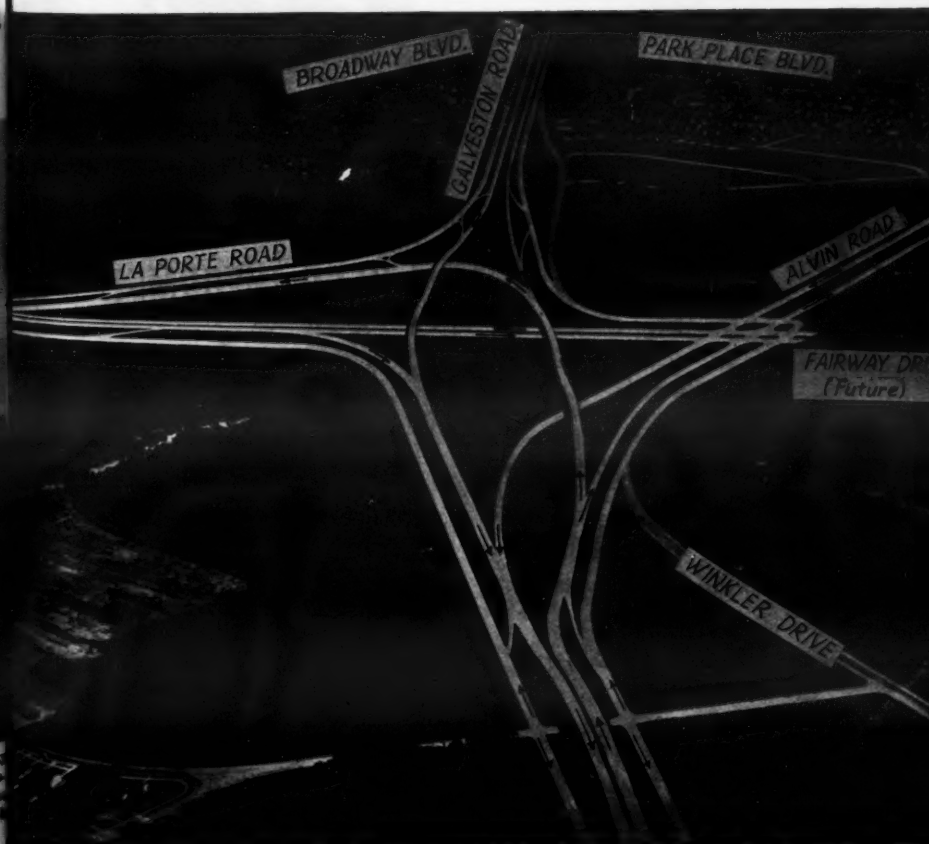
& E. M.

(See article on page 6)



ENGINEER-MANAGER. W. J. Van London, Expressway Engineer-Manager for the Texas State Highway Dept., worked with LA and Houston officials to integrate the vast project.

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ffice



SOUTHEAST END. Service roads 32 feet wide (photo above) parallel the expressway and permit vehicles to enter or leave at designated intervals. Pavement for service roads and expressway is 8-inch portland-cement concrete laid on a flexible-base material 9 inches thick. There is a 4-foot median strip on the expressway, and raised emergency parking shoulders are 10 feet wide. Future work to be done at the southeast end of the expressway (photo at left) includes expressway wings towards La Porte and Galveston. When completed, the project will feature a synchronized system of signal lights to control and direct traffic on the four-street feeder system, as well as on all cross streets. It will permit automatic adjustment of time cycles for variations in traffic volume and direction.

Convention Calendar

July 21-23—ASCE Meeting

Summer convention, American Society of Civil Engineers, Olympic Hotel, Seattle, Wash. Col. William N. Carey, Executive Secretary, 33 W. 39th St., New York 18, N. Y.

July 26-28—Western Highway Officials

Annual meeting, Western Association of State Highway Officials, Multnomah Hotel, Portland, Oreg. E. V. Miller, Secretary, Arizona State Highway Dept., Phoenix, Ariz.

Sept. 19-24—AASHO Meeting

Annual meeting, American Association of State Highway Officials, Utah Hotel, Salt Lake City, Utah. Hal H. Hale, Executive Secretary, 1220 National Press Bldg., Washington 4, D. C.

Oct. 2-10—Construction Exposition

Construction Industries Exposition, Houston Chapter, Associated General Contractors of America, Inc. L. W. Duddleston, General Manager, or Russell W. Nix, Chairman, Exposition Committee, AGC Office Bldg., Gray and Crawford Sts., Houston, Texas.

Texas Chapter Joins AGC; W. Va. Unit Adds Members

The thirteenth Texas chapter to join The Associated General Contractors of America, Inc., has just been granted a charter. Known as the Mid-Continent Pipe Line Chapter, it is composed of contractors who specialize in the construction of cross-country pipe lines for the transmission of oil and gas. Chapter headquarters are located in Dallas, Texas.

The West Virginia Chapter of the AGC has announced its intention to represent all highway and heavy-construction contractors throughout the state. Previously, this group had been composed only of building contractors. Membership is now open to all types of general contractors in the state, including those doing airport, municipal, and all other types of construction.

Air-Activated Conveyor

Literature describing the Robinson air-activated conveyor systems has been prepared for distribution by the Morse Boulder Destructor Co., 205 E. 42nd St., New York 17, N. Y. These systems are especially recommended by the manufacturer for use with cement or other fine, granulated materials. Their distinctive feature is air activation, and Bulletin No. 311 tells how the air-

activated material is conveyed through the pipes of the system to where it is to be used or stored.

The bulletin describes the system in detail, and lists its features. A schematic drawing of a typical installation shows how the material passes through the piping system from the unloading car to the various activators and storage

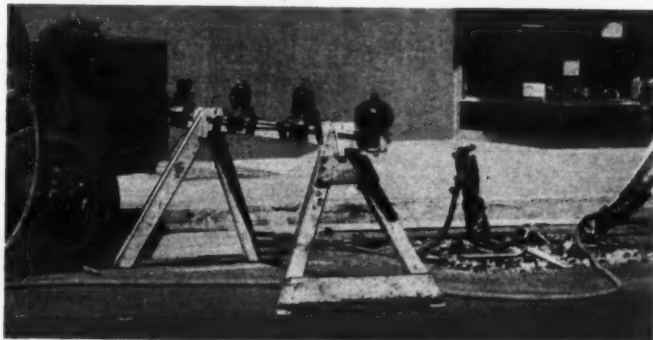
tanks, and to its final location. The bulletin lists the materials with which this type of system can be used, and its operating and maintenance features such as its flexibility, cleanliness, and rapid handling.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 34.

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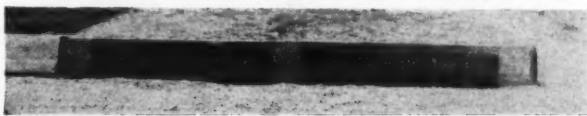
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Crocker curb inlet for catch basins (U.S. Patent File No. 599,415) on highways has a lug which binds into concrete top and wall of catch basins and keeps inlet intact despite any expansion and contraction of concrete in hot and cold weather. Mfg. by Campbell Foundry Co., Harrison, N.J., and Flockhart Foundry Co., Harrison, N.J.

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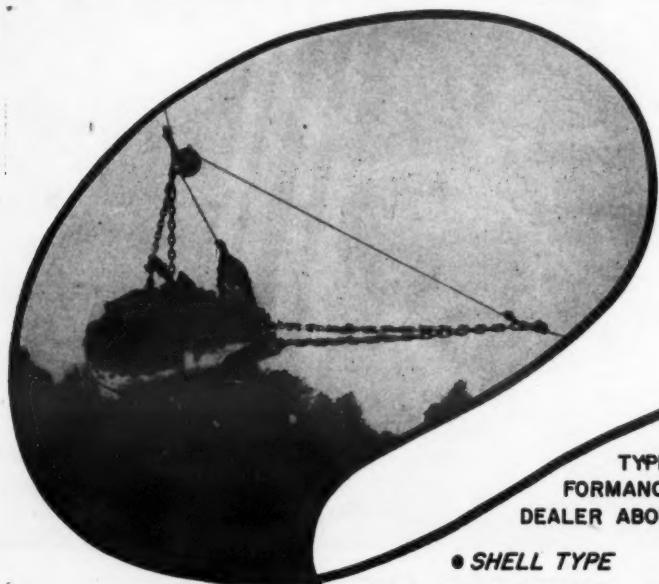
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Speedy Concrete Gang Uses Two Pavers on Big New Job

Koss Features Mobility, Organization, and Speed On Contract to Build New Two-Lane Concrete Road

SHOOTING for a peak paving rate of 240 feet an hour, concrete crews of the Koss Construction Co. of Des Moines, Iowa, brought rapidly to completion a brand-new 13.3-mile section of 22-foot concrete pavement for the Kansas State Highway Commission. So close did these speedy concrete men come to their mark that they poured 2,327 linear feet in a 10-hour day.

The new job is on north-south U. S. 77, from Augusta, Kans., south to a point about 3 miles below Douglass. Koss Construction Co.'s contract for pavement, granular base, shoulders, and miscellaneous work included one \$253,602 job and a \$368,749 job. Both jobs adjoint, and were so let for convenience in bidding.

The new highway will eliminate a narrow, crooked road that has been dangerous for many years. Two abrupt turns—they call them "jogs" in Kansas—will be things of the past when the new road goes into service late this summer. Grading on the new section was completed generally last season, and work is still under way on the bridges which will carry the new highway over Walnut Creek and other small streams which it intersects.

Built to Modern Standards

The new highway was designed to standards as modern as possible. About 6 miles are 9-inch uniform reinforced-concrete pavement, set on a 4-inch course of compacted granular sub-base. The remaining 7.3 miles have the same granular base course, but the concrete slab is 9-8-9. It, too, is reinforced.

Gentle curves will carry the new road through the rolling country of south-central Kansas. Under the Koss contract, 8-foot compacted earth shoulders will be built on each side of the highway. Extensive plans for seeding, tree planting, and a roadside park are in the making, and it is likely that a separate contract for this work will complete the job late this year. The pavement itself was started on April 6, 1948, and was scheduled for completion by May 30, 1948.

The principal quantities in the job included 103,248 square yards of 9-8-9-inch concrete pavement in the south part of the job, 68,117 square yards of 9-inch uniform pavement on the north section, 78,800 cubic yards of earth work in connection with shoulders, and 187,120 square yards of select granular sub-base material.

Granular Base Is Prepared

Koss used a standard earth-moving fleet to dig the granular sub-base material, haul it to the job, and process it. This fleet was made up of four Caterpillar DW10's, two Caterpillar No. 12 motor graders, a Galion 201 motor grader, a Seaman Pulvi-Mixer, rollers, and water-tank trucks.

Granular material, composed of alluvial gravel and clay, was excavated from borrow pits which had been sampled and studied by technicians of the Kansas State Highway Commission. The DW10's dug and hauled this material, aided by a Caterpillar D8 pusher.

The base was laid down in one lift, generally about 5½ inches deep uncompacted. The volumetric content had been calculated at 35 cubic yards per

100 feet, and the material was placed as close to that figure as possible. When the DW10's had dumped a stretch about 1,000 feet in length, processing machines started to work.

First the material received the attentions of the Galion motor grader, the two Caterpillars having gone ahead to shape the earth subgrade ahead of dumping. The Galion machine shaped the granular material up to a windrow, because further mixing was required to blend the material and distribute its particles more uniformly.

A Seaman Pulvi-Mixer, pulled by a rubber-tired Oliver tractor, then



C. & E. M. Photo

This is the Koss batch-plant set-up at Gordon, Kans., on the Santa Fe railroad. A second Johnson bin is right behind the one in the center of the photo. Cranes and clam-shell buckets are working in the background.

worked the windrow thoroughly. In a few passes this machine did the work of many hours of blade mixing. The Pulvi-Mixer, driven by a powerful Waukesha engine, lowered its tines deep in the material to mix, blend, and agitate. This machine was also found to be

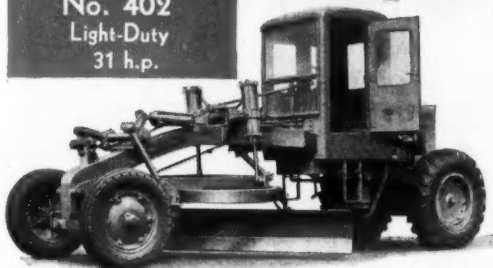
very helpful when two heavy rains fell on the job, because it readily aerated the material.

When it had finished, the Galion motor grader drifted the windrow back across the road, and water was added by

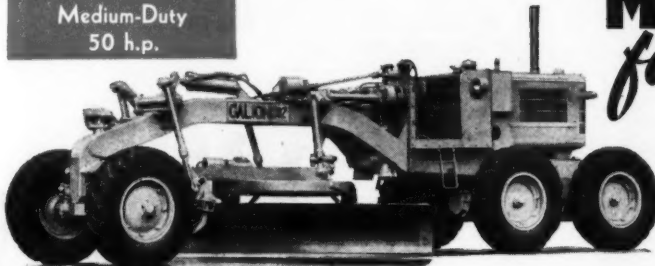
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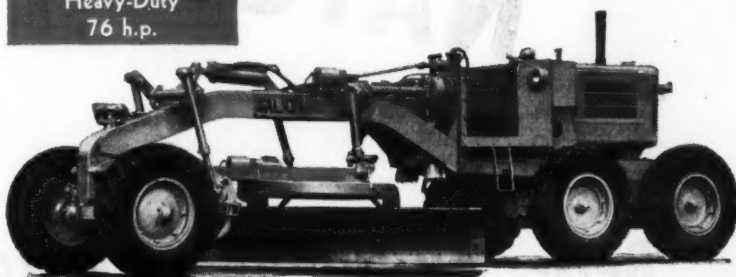
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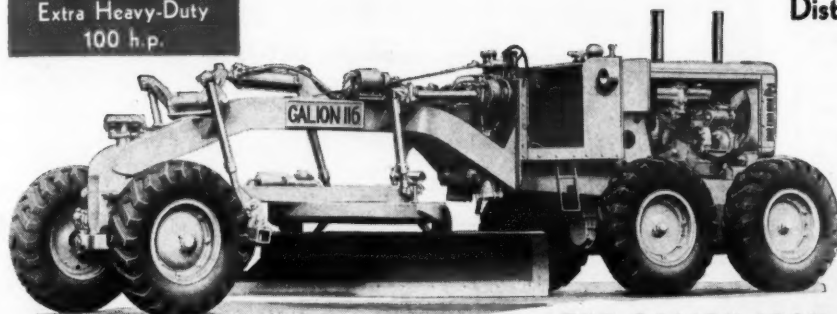
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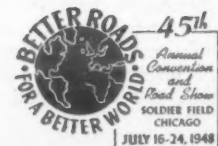
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GRADERS · ROLLERS

Concrete Gang Uses Two Pavers for Job

(Continued from preceding page)

tank truck to bring the moisture content up to approximately 12 per cent. The lift was then heavily compacted by an Oliver-drawn sheepsfoot roller. To finish off the top, a Bros pneumatic-tire Wobble Wheel roller was used in conjunction with a motor grader. The finished surface was generally smooth, hard, and tight, and was left within close practical limits ahead of the paving crew's fine-grading machine. As soon as granular-base preparation was finished, State Highway Commission engineers came in to set the paving stakes.

Preparing for Paving

Paving-wise John Beuerlein, the oldest of Koss's well known "paving Beuerleins", has helped to develop the firm's concrete operations to a high point of efficiency.

He brought in 3,000 road-feet of Blaw-Knox steel forms, with 9-inch sides and 9-inch bases. He figured that, if the paving crews operated near their peak efficiency, only 600 feet or so would be available to take care of contingencies. The selection of this amount of forms also guaranteed, in a sense, that so long as the paving machines were crawling forward at a rate close to 240 feet an hour, the form setters would have to move considerably faster than a crawl to stay ahead.

This was figured so accurately that the form setters and strippers frequently started work about an hour ahead of the paving crew. The two form setters were aided by a small gang of six laborers, who smoothed up the few irregular places left in the wake of a Cleveland Formgrader, the machine which excavated the form trench.

Beuerlein is also wise in what is called "form economics". Knowing that a solid base under a concrete form is the best insurance against its rocking later on under the weight of equipment, he brought in a small Jaeger form tamper to work material under the form bases.

Form lining was done by a head liner and two helpers, and the long lines of steel were laid out ahead true as a string line could make them. When they were all in place and aligned, a man came along with a small orchard-type spray pot and oiled the sides so the concrete wouldn't stick. This he did carefully, because paving-equipment wheels spin when form oil spills on top of the form.

A Buckeye Model RB Finegrader then moved in to dig the base off true to grade. Very little excess material had been left behind the DW10's. What little material the Finegrader had to handle went outside the forms, by way of its bucket line, and was leveled off by a motor grader so the batch trucks could use the shoulders readily.

A shop-made planer, pulled by an Oliver tractor, was then used to take off about 1/8 inch of material left behind the Finegrader. This final operation swept the surface smooth, and except for a light sprinkling it was ready for concrete. Sprinkling was done with a hose, about 100 feet ahead of the paver.



Above, a Cleveland Formgrader excavates form trench on the Koss paving job in Kansas, while a Gallon motor grader smooths the subgrade. At right, workmen set steel forms.



C. & E. M. Photos

Joints and Special Features

The new highway has special expansion joints every 500 feet, and contraction joints on 20-foot centers. A heavy-Type B non-extrusive fiber board 1 1/2

inches thick was used for expansion joints, set 2 1/4 inches low from the top of the pavement. After the pavement was finished, this top slot was filled with Sealz rubber-asphalt joint filler.

The fiber-board sheets came in pieces 11 feet long by 6 3/4 inches wide. In the case of 9-8-9 pavement, one end of each board had to be trimmed in the

(Continued on next page)

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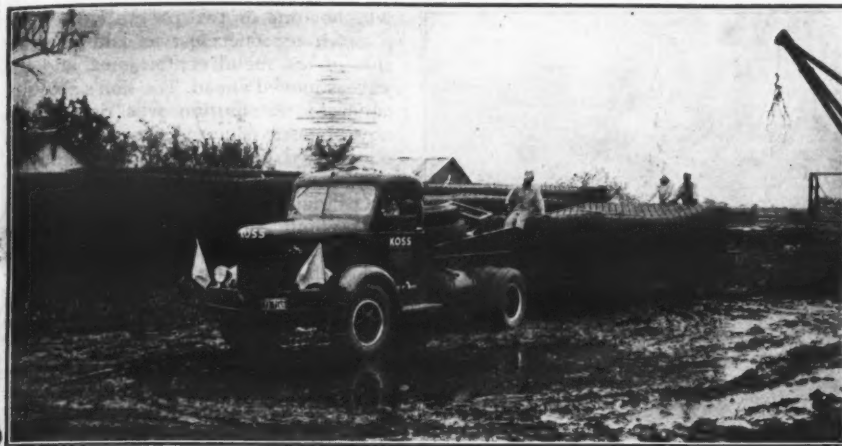
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C. & E. M. Photos

At left, a Koss Construction Co. steel crew sets out for the Kansas paving job on U.S. 77 from a railroad siding at Gordon, Kans. The FWD truck they are riding carries a load of steel reinforcing mats $10\frac{1}{2} \times 20$ feet in size and made from No. 4 6×12 -inch mesh. Ordinarily a ground crew of 3 handled these mats at the paver. In the photo above, sections of Blaw-Knox road forms are moved ahead about 14 hours after the concrete pour. An FWD flat-bed truck, equipped with a winch, strips the forms and loads them, all in one operation. The forms were not cleaned until they were set. This whole job fitted together like clockwork, with every operation neatly planned.

field to meet the subgrade. The expansion joint was completed by round steel dowel bars $\frac{7}{8} \times 24$ inches, spaced on 12-inch centers. These dowel bars were painted on one end with red lead, greased, and capped.

A special chair device, manufactured by Sheffield Steel Co., was used to hold the expansion joint perfectly plumb, and to support the dowel bars in a true plane. A steel basket, with bars designed to support the base of the joint on both sides, was made. This basket and six pins which held it down to the subgrade were left in the slab.

So hard and dense was the sub-base on which the pavement was poured that a small jackhammer had to be used to drive the pins down, or to make the holes so they could then be set in place with a sledge hammer.

A metal cap was then installed and pinned to hold the top of the joint in position. This cap was removed after the pavement had set up.

Transverse contraction joints were formed by a Flex-Plane machine, and metal strips installed at the time of the pour. Later, when the slab took on its initial set, these strips were removed.

Longitudinally on the center line of the highway was a weakened-plane joint, made up of a metal center-joint strip with $\frac{1}{2} \times 36$ -inch round dowel bars placed on 30-inch centers. These bars passed through the metal strip, and were supported on each end by steel chairs. Holes for these supports were also air-driven by a pneumatic gun from the paver air supply.

The Batch Plant

The heart of the paving job was its batching plant, where sand, cement, and rock aggregates were weighed out at the specified proportions. Two batching-plant set-ups were made: the first one at Douglass, where the south 5 miles were poured; and the second at Gordon, where the remainder of the job was poured. The controlling factor in moving the batch plant was Walnut Creek, where a bridge had not been completed. Reaching that point, John Beuerlein had to jump the stream with all his equipment.

Both batching-plant set-ups were made on the Santa Fe railroad, with a dead haul of $\frac{1}{2}$ mile to the job in both cases. The batching plant consisted of two Johnson 55-cubic-yard bins, a 100-barrel Johnson bulk-cement silo with a Johnston Dutchmill plant, at Manitowoc Model 3000 crane with a 65-foot boom and a 2-yard Blaw-Knox clam-shell bucket, and a Northwest Model 8 with a 65-foot boom and 2-yard clam-shell.

Concrete Materials Co. of Moline, Kans., supplied the job with rock aggregates. Sand was shipped in from three sources of supply on the Arkansas River, about 25 miles away. The Consolidated Cement Corp. of Fredonia, Kans., supplied bulk cement, usually in hopper-bottom cars. All concrete materials came in by railroad.

Due to a shortage of hopper-bottom cars, some of the cement arrived in boxcars. Unloading boxcars of bulk

cement is somewhat of a problem. It was solved by bringing in a Hough Payloader and a timber platform. Operating from the platform, the Hough Payloader unloaded the cement, moved it across the platform to a chute, and discharged it towards the screw feeders

which fed the material up to the storage silo.

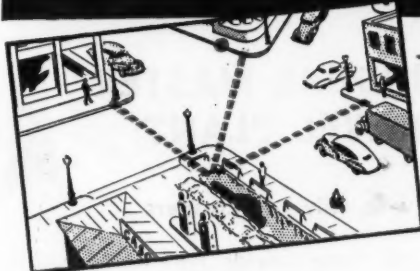
On peak days, about 5 cars of cement, 15 carloads of sand, and 25 carloads of rock were handled. Two clams were necessary to keep the bins charged, not only because of the great amounts

of materials used, but also because state specifications required the material to be unloaded and stockpiled prior to being put in the batch-plant bins. This provision is designed to make the moisture content more uniform, and

(Continued on next page)

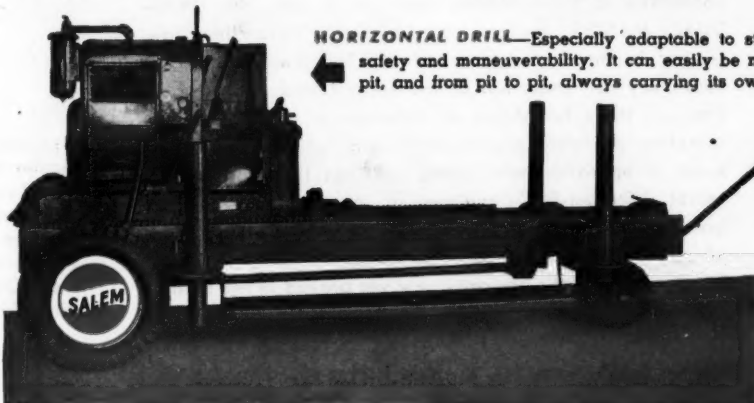
FOR EASIER · FASTER Drilling

PUT A Rugged McCARTHY ON THE JOB



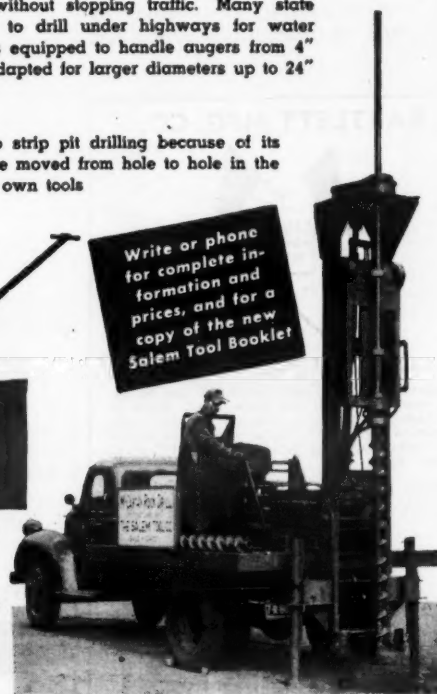
★ AVAILABLE NOW IN 3 MODELS TRENCH-TYPE · HORIZONTAL · VERTICAL

THE McCARTHY TRENCH-TYPE DRILL.—Can be used without cutting road or street surfaces, or without stopping traffic. Many state highway departments use it to drill under highways for water drainage. The Trench-Type is equipped to handle augers from 4" to 12" diameter . . . can be adapted for larger diameters up to 24" in certain earth formations.



HORIZONTAL DRILL.—Especially adaptable to strip pit drilling because of its safety and maneuverability. It can easily be moved from hole to hole in the pit, and from pit to pit, always carrying its own tools

VERTICAL DRILL.—Finger-tip power control raises or lowers the derrick with ease, and a 32 h.p. motor is an integral part of the truck-mounted machine. This drill is used on $1\frac{1}{2}$ -ton trucks or larger, and is also adaptable to diamond drill boring. Ease of operation results in more holes per day. This machine has drilled 6" diameter holes 80 feet deep in 20 minutes.



Write or phone for complete information and prices, and for a copy of the new Salem Tool Booklet

MINING EQUIPMENT SINCE 1901

THE SALEM TOOL COMPANY

SALEM, OHIO, U.S.A.

V. W. Williams Co.
Columbus, Ohio

Rick Equipment Co.
Harrisburg, Pa., Bedford, W. Va., Charlotte, W. Va.

A. T. Green Machinery Co.
Pittsburgh, Pa.

Diamond Supply Co.
Birmingham, Ala.

West Virginia Supply & Equipment Co.
Charleston, W. Va.

Alvin & Contractors Supply Co.
512 Second Ave., North Birmingham, Ala.

Hoover Machinery & Supply Co.
Chattanooga, Tenn.

Concrete Gang Uses Two Pavers for Job

(Continued from preceding page)

to mix the rock.

The dry batches were weighed out on the basis of 740 pounds of cement, 1,974 pounds of sand, and 2,589 pounds of 1-inch-maximum-size rock. Twelve International K-6 and K-7 trucks, each hauling two batches per load, carried the material out to the pavers. Ordinarily the trucks drove straight through under the batch bins to take rock, then sand. Then as they drove by a small platform, a laborer quickly leveled off the batches. Cement was added at the top of the batches, and the trucks started out to the job.

Paving

Two Koehring 34-E Twinbatch pavers were used simultaneously on about half of the job, with their high output handled by fast-moving finishing equipment of the latest type. They could not be used together on the entire job because of limited working space. Each paver had to use one shoulder when it worked, making it necessary for water and service trucks as well as empty batch trucks to use the ditches and other low parts of the right-of-way. On about half the job, this space was not wide enough to let them get through.

Because of the fine surface being made, production of the pavers had to be held to a maximum of 240 feet an hour to get the most out of the spreading and finishing equipment. This does not imply that the pavers were not busy at that speed; far from it! Both pavers had to mix and dump batches with continuous regularity to attain that production.

Mixing water came to the pavers in 1,500-gallon tank trucks. John Beuerlein's mixing-water arrangement saved him a third truck. He mounted a 5,000-gallon tank on a tower near Walnut Creek, fitted it with an overflow pipe and a 6-inch outlet that would load a 1,500-gallon tank in 3 minutes, and put a Wisconsin-driven 3-inch Gorman-Rupp pump to work continuously at the tank. The time he saved in loading water amounted to the saving of a truck with its driver on his job. The water was transferred to the paver by the 2-inch Gorman-Rupp centrifugal



Koss Construction Co. Photo
Two Koehring 34-E Twinbatch pavers were used simultaneously on a part of the Koss paving job in Kansas. The rest of this paving line-up is headed by a Jaeger spreader.

pump on the machine.

Mixing time was 30 seconds per drum in the pavers, and the concrete was dis-

charged stiff, at a slump of 1 inch and under.

In placing the concrete, regardless of

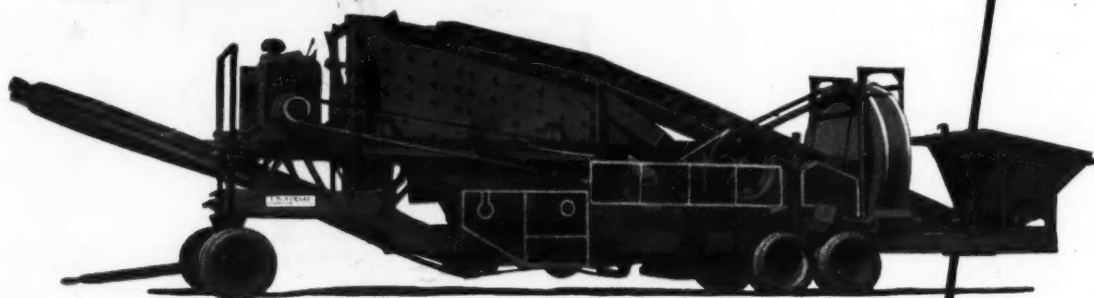
whether one or two pavers were used, a batch of concrete was laid on each side of the metal center joint, and the pavers moved ahead. The lion's share of concrete distribution was done by a new Jaeger concrete spreader, which distributed the fresh concrete between the forms.

Ordinarily the paver and spreader laid about 40 feet of concrete, the spreader striking it off about 2½ inches below the top of the forms. The spreader and paver then rolled back, and a ground crew of three men quickly brought in the 10½ x 20-foot mats of No. 4 6 x 12-inch mesh steel reinforcement and laid them in place. The pavers and spreader then dumped the rest of the concrete needed to finish the slab.

Two Vibro Spades, controlled by the Jaeger spreader operator and attached to the spreader frame, vibrated the concrete at the form lines. Surface vibration of the slab was done by means of a Jackson twin-tube surface unit attached to the first finishing machine.

(Concluded on next page)

EVERY THIRD YARD A BONUS*



UNIVERSAL TWIN DUAL MASTER PORTABLE GRAVEL PLANT

- 3 stages of reduction with only two crushers

Here's cost-cutting output to meet today's needs. Here's portability to move quickly from job to job. The TWIN-DUAL MASTER features a Universal Streamline jaw crusher in the first stage, and the TwinDual Method of secondary roll reduction in the second and third stages. Yes . . . three full stages of reduction in one single-unit, complete portable gravel plant. Unusually smooth and quiet in operation with roller bearings throughout. Universal "Stream-Flo" engineering provides the perfect balance of screen and auxiliaries to assure steady flow of aggregate finished to specifications. For the plant that's basically new yet proved in the field—for a bonus in profit-making production, make your next investment a TWIN DUAL MASTER.

Ask for Bulletin No. 682

UNIVERSAL ENGINEERING CORPORATION
620 C Avenue N.W. Cedar Rapids, Iowa

DESIGNERS AND BUILDERS OF "STREAM-FLO" ROCK, GRAVEL, AND LIME PLANTS, SCREENING AND WASHING PLANTS—CONVEYORS—APRON FEEDERS

*FIELD PERFORMANCE PROVES IT!

Operating in the same pit, the TwinDual Master has delivered more than twice the output of conventional single-unit portable gravel plants of comparable size and weight. You'll want to compare its performance with that of your present equipment. Find out for yourself the BONUS in yardage it can earn in your pit. Write for complete facts and figures.

There is a Universal Combination for every crushing problem. Let us know your needs. Our engineers will recommend the equipment best suited for the job.



Booth No. 2616

BARTLETT MFG. CO.



Automatic Type Tripod standard can be set up instantly. Will not blow over. Folds in a flash for compact carrying. Sturdy construction. 4 Ft. Automatic Type (illustrated) has locking cam for tripod legs, and 18" x 18" metal sign.

Sample stock wordings: "DANGER", "MEN WORKING", "MEN WORKING ABOVE", "MEN WORKING IN TREES", etc.

Write for Catalog No. 29

NOW AVAILABLE

Bartlett tree paint for application to tree wounds.

Also Pruning Saws.



BARTLETT MFG. CO.

3003 E. GRAND BLVD. DETROIT MICHIGAN



UNIVERSAL LEADS THE WAY
With More Yards Per Hour
At Less Cost Per Yard

Latest Equipment on Finishing

One of the newest finishing machines, the new Jaeger Type H diagonal-screed finisher, was used just behind the spreader. The rear screed of its 2-screed system can be moved at either end. On super-elevated curves, the screed can be quickly set to sweep concrete uphill towards the high form. On straightaways on this job 1,500 feet was checked with a straight-edge and not a flaw was found.

Moving rapidly behind the spreader, this new machine put the initial mechanical surface on the concrete. It was followed by a Flex-Plane machine, which installed the contraction joints. A Koehring Longitudinal Finisher then finished the slab over the top of the contraction-joint metal.

Hand finishing included the use of two long-handled steel floats, and edging tools around the form lines and contraction joints. A center striping bridge just behind the hand floats was used to put down a black iron-oxide center stripe in the green concrete. A small roller traveling in the template slot roughened the concrete surface 6 inches wide, and the black iron oxide was then applied and floated in with a hand float.

Hunt Process curing solution was used, applied by a shop-made rig. This machine rides along on the forms, and has a continuous spray system of 26 nozzles, furnished by the Hunt Process manufacturer. The nozzles are fitted on a full-width bar, and pressure for the solution is supplied by a Wisconsin-driven Roper pump.

With such close timing on the concrete forms, only about 14 hours elapsed from the time the concrete was poured until the first forms were removed. A hook pin puller, attached to the bulldozer blade of a Caterpillar D4 tractor, extracted the steel pins. An FWD flat-bed truck, equipped with a winch, stripped the forms and loaded them, all in one operation. The forms were not cleaned until they were set.

Every operation was so neatly planned and every man was so neatly spotted that this paving job fitted together like a piece of fine clockwork. The entire thing was reduced to a system, so that each man knew exactly what to do and when, and confusion was eliminated.

Geared to a production of 400,000 square yards of paving per season, Beuerlein's crew had about 75 per cent of its year's quota under contract in April, and was looking forward to new work about to be announced. These men in the Koss paving line-up are assured of work throughout the paving season, if they can do their part well and stand up under the pressure.

Personnel

The Kansas job was designed and supervised under the general direction of R. C. Keeling, State Highway Engineer, with H. O. Reed as Engineer of Construction. The job was done in the Hutchinson Division, of which L. S. Munn is Division Engineer and E. H. Wehmeyer is his assistant. J. A. Doubrava was the Resident Engineer on the job.

In addition to Superintendent John Beuerlein, Koss Construction Co. was represented by Harold Beason, Paving Superintendent; Walter Abrams in charge of the batch plant; Lloyd Arnote, Grading Superintendent; Master Mechanics Emil Dostal and Moss Hickman; and Office Manager Harold Whitney.

Power Hand Tools

A catalog on its line of portable power tools has been issued by the Mall Tool Co., 7738 S. Chicago Ave., Chicago 19, Ill. Among the tools listed in Bulletin No. 582 are a 1½-hp gasoline engine, a concrete vibrator with a gasoline-engine power unit, a concrete vibrator mounted on a round base, a 3-hp



Koss Construction Co. Photo
Superintendent John Beuerlein stands in the doorway of a Freuhauf trailer which houses the field office of Koss Construction Co. An article on page 131 tells how Koss has achieved mobility with trailers to transport heavy equipment, spare parts, a repair shop, et cetera, from job to job.

geared-head concrete vibrator, a 1½-hp electric concrete vibrator, a pneumatic concrete vibrator, chain saws, land-clearing power saws, speed saws,

and other powered hand tools.

Each of these items is illustrated, and text describes its principal features. Complete specifications are provided,

as are instructions on care and maintenance. The catalog enumerates the sizes and styles in which each of these items is made, and recommends uses for each. Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 23.

Water, Oil Unloader For Compressor Tank

A device for removing water and oil from air-compressor tanks has been put on the market by the A. Shelburne Co., 739 Ceres Ave., Los Angeles 21, Calif. It is designed to fit any electrically operated air compressor which has a centrifugal or magnetic unloader.

The Lansdale water unloader is said to draw off water and oil automatically as they collect. A wire-mesh screen is inserted ahead of the unloading mechanism to filter out harmful particles.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 81.



Barber-Greene

Model 705
ROAD SPEED
15 M.P.H.

SOME ADVANTAGES OF THE B-G DITCHER

- 15 m.p.h. Road Speed
- Vertical Boom
- Automatic Overload Release
- Hydraulic Boom Control
- Range of 10 Digging Speeds
- Tractor Type Pneumatic Tires
- All-Weather Traction
- Hydraulic Brakes
- Automotive Steering
- Year-round Operation

Here's the machine that's been sorely needed in scattered service trenching . . . it's the B-G Runabout Ditcher, driven from job by its operator at 15 m.p.h. Cutting 5½" wide and down to 4' deep, the Runabout offers ten cutting speeds for most efficiently meeting the local conditions. It has proved its ability to cut through such difficult materials as frozen ground and bituminous pavement.

Mounted on pneumatic tires, this Ditcher is easy on walks and lawns, making it ideal for house connections. Simply raising the boom makes it

ready for travel. Requiring no trailer, the Runabout is a completely one-man machine, establishing a new standard of economy in ditching for gas, telephone, water and power lines. It is ready for work at the next job upon arrival. No unloading, no adjustments, no conversion parts. Designed for simple operation and easy servicing, the B-G 705 Ditcher uses IHC-1-6 Tractor Components. For complete information about this and other B-G Ditchers, see your Barber-Greene Representative or write, Barber-Greene Company, Aurora, Illinois.

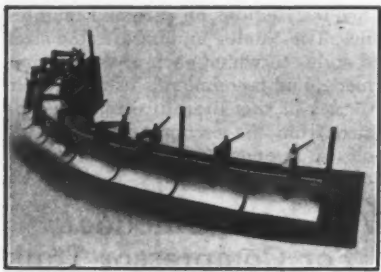


BARBER · GREENE COMPANY, AURORA, ILLINOIS

Constant Flow Equipment



LOADERS PERMANENT CONVEYORS PORTABLE CONVEYORS COAL MACHINES BITUMINOUS PLANTS FINISHERS DITCHERS



Overhead hangers support the face forms on the improved Heltzel flexible steel curb forms. They permit face and back forms to be locked together without division plates.

Curb-and-Gutter Form Has Overhead Hanger

An improvement in its flexible steel curb forms is announced by The Heltzel Steel Form & Iron Co. of Warren, Ohio. According to the manufacturer, it is now possible to lock the face and back forms together without division plates. This is accomplished, it is pointed out, by supporting the face forms with overhead hangers.

These overhead hangers permit construction of concrete curbs in any length without breaks or scoring of the concrete. There is said to be ample clearance beneath the overhead hanger for hand finishing. The position of the hangers on the form is adjustable within the section length, to allow for obstacle interference.

The overhead hanger is one of three optional face-curb form supports supplied by Heltzel. The other two are the full-depth division plate and the skeleton division plate. Heltzel curb-and-gutter forms are made from No. 11 gage high-carbon steel in sections of 10 feet—either straight or battered face construction. They are used for constructing radius curbs, curbs and gutters, or sidewalks when the radius is subject to frequent changes.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 109.

Waterproofing Agent

A data sheet giving complete instructions on the use, application, and purpose of Formula No. 640 waterproofing compound has been prepared by the Haynes Products Co., 4007 Farnam St., Omaha 3, Nebr. The compound is described as a clear, transparent liquid made up of special compounds dissolved in a hydrocarbon base. It is said to prevent the seepage of moisture through concrete, brick, mortar, or other building materials, even when the protected parts are subjected to a hydrostatic head.

This data sheet describes how the solution is pulled into the pores of the material being protected, the reasons for its effectiveness, etc. It tells what the compound will do, what it will not do, and how to use it on various types of materials. It explains how to prepare the surface to be protected, and it includes the guarantee provided with the Haynes compound.

Also described in this literature are other Haynes products—the cement hardener, Hayproc floor resurfacer, paint remover, asbestos fiber coating, plastic cement, and others.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 116.

Twin Disc Branch Moves

The Twin Disc Branch Sales Engineering Office in Tulsa, Okla., has been moved to 2910 E. 15th St. Wade A. Eskridge, Assistant District Manager, is in charge of this district which embraces Oklahoma, Kansas, Missouri, and Colorado. Twin Disc manufactures a line of friction and air-actuated clutches, hydraulic couplings, hydraulic torque converters, power take-offs, reduction gears, and marine gears.

Lightweight Firer Sets Off Ten Shots

A firing mechanism for use in blasting operations has been announced by the Farmers Engineering & Mfg. Co., 549 Brushton Ave., Pittsburgh 21, Pa. According to the manufacturer, it will develop sufficient charge to detonate from 1 to 10 shots. The Femco shot carrier weighs slightly over one pound and is equipped with a belt hook to permit its being carried at all times under the supervision of the person responsible for firing operations. It can be used without removing it from the belt.

Capacitor-operated detonating charges are transferred to two condensers and then to the explosive by use of a special safety key. This key is designed to prevent the accidental discharge of condensers to the firing line. Other safety features include automatic dissipation of the charge if not used, recessed terminals, non-metallic non-conducting case, and a Neon light which indicates when the unit is ready to fire. The Femco firer is said to meet the U. S. Bureau of Mines requirements and to carry its approval No. 1603.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 66.

Line of Road Machinery

A line of angle and bulldozer blades, power-control units, loaders, and disk harrows is described in a catalog available from West Coast Machinery, Inc., P. O. Box 1057, Stockton, Calif. The catalog describes each of these units in detail, pointing out its principal features, the sizes in which it is made, and other data of use to users. Each of the units is illustrated, and complete specifications and dimensions are provided for each.

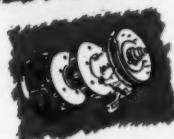
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 72

A New, Big, Powerful Diesel Machine with WARD LEONARD SWING AND AIR CONTROL

Check these outstanding features!



AIR CONTROL for hoist and crowd, and **ELECTRICAL CONTROLS** for swing, travel and boom hoist... ideal for smooth and accurate handling. Bell-cranks, pins, toggles and connecting rods are eliminated.



LARGE DIAMETER, WIDE-FACED DRUMS add to cable life... mounted on anti-friction bearings for easier running and longer service.



DOUBLE SHROUD SHIPPER SHAFT PINIONS are spline-connected to the crowd shipper shaft for maximum strength and operating efficiency. The shaft is supported by oversized bearings.



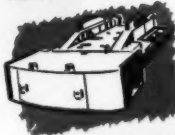
ALL-WELDED BOOM for maximum strength is provided, with a wide spread base. Extra large boom point sheaves increase cable life.



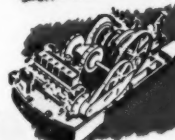
NON-CLOGGING, SELF-CLEANING CRAWLERS are built to shed dirt and to prevent material from packing in. Lower frame is rugged, all-welded construction.



SWIVELING FAIRLEAD—sealed against dirt and assures proper lead of drag cable at all times.



ALL-WELDED DEEP UPPER FRAME of single unit construction for maximum strength. This upper frame can "take it" in the toughest kind of digging.



OPERATING MACHINERY—modern... compact... sturdy... readily accessible for routine maintenance.

Write today for 111-M Bulletin describing this new, fast, powerful Diesel Shovel equipped with an Electric Swing.

BUILT FOR FAST, HEAVY DUTY SERVICE!



● This husky, Diesel powered machine, equipped with air control and Ward Leonard electric swing, has demonstrated its capacity as a profitable yardage producer in all kinds of digging. It has remarkable maneuverability to work in tight places—unusual stability to resist pitching or rocking while digging. It propels and steers with the upper frame in any position and will make a 30 percent grade with ease.

The MARION 111-M is easily converted—right on the job—from shovel to dragline, crane, clamshell or long range shovel. Shipped without major dismantling.

Make your next shovel a MARION 111-M and profit by its BIG YARDAGE capacity and low operating cost. Write for more information today.

Portable Impaction Tool

A portable tamping unit for asphalt and concrete paving is made by Wayer Impactor, Inc., 330 Rowlands Bldg., Columbus 15, Ohio, and literature about it is now available from the company. This literature describes the Models No. 20 and 25, and tells how they can be used for tamping and finishing asphalt, concrete, resurfacing and patching materials, etc. The Wayer Impactor can also be used for impaction of gravel, stone, clay, and other similar materials, the manufacturer explains.

The Wayer bulletin describes both units in detail, pointing out the speeds

of operation, power units, recommended uses for each model, and results of tests run by the company. Listed on the back cover of the bulletin are 21 advantages claimed for the units by the company.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 50.

Data on Weigh Batchers

A 6-page folder covering the Noble line of weigh batchers has been released by the Noble Co., 1860 Seventh St., Oakland 7, Calif. Feature of the folder is a description of the three main types of batching control supplied by Noble

—manual, semi-automatic, and full-automatic.

The company has recently made dial scales available as optional equipment on the manual and semi-automatic batchers, and these are described in detail. A cutaway view of the hopper shows how the control and operation of the dump gates has been designed to provide fast and efficient dumping with a minimum amount of dust and cement loss. The Noble back-balance poise-beam scales are also described in the release.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 12.



Mack's new high-speed truck-tractor, powered by a Thermodyne engine and available with a Mono-Shift transmission, is ready for delivery this month.

Truck-Tractor Unit Features New Shift

A new 45,000-pound truck-tractor unit has been added to its line by Mack Trucks, Inc., 350 Fifth Ave., New York 1, N. Y. Features of the Model EQT are its 431-cubic-inch Thermodyne engine, and the Mono-Shift transmission. At a governed speed of 2,500 rpm, the Thermodyne engine is said to develop 139 hp. Torque output at 1,400 is listed at 330 foot-pounds.

The Model EQT is equipped with a 13 $\frac{7}{8}$ -inch-diameter single-plate dry clutch having an engagement area of 202 square inches. Two Mack-built transmissions are available. Standard is the Mack 5-speed direct-in-fifth Model TR-311 transmission. The Mono-Shift TRD-313 duplex transmission, available as optional equipment, is said to provide ten speeds, and is controlled by a single gear-shift lever. According to Mack, compound shifts in either direction may be made simultaneously with main-box shifts with the Mono-Shift. Pre-selection of the compound ratios is another feature.

The chassis uses a box-girder design. Rubber shock-insulators retain the spring ends to provide easier riding. Steering is controlled by a worm and roller. The air brakes have an area of 533 square inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 82.

Molded Fabric Bearings

A catalog on its complete line of bearings is being distributed by the Gatke Corp., 228 N. LaSalle St., Chicago 1, Ill. These are made in a wide range of styles, shapes, and sizes for use with construction equipment, conveyors, and other bearing applications. The Gatke method of producing bearings by precision molding of resin-bonded fabrics is described in detail in Catalog No. HB-530.

The bulletin lists the various features claimed by the manufacturer and shows how these help combat the effects of shaft misalignment. It also describes the physical characteristics of these bearings which help them withstand other kinds of abuse to which bearings are subjected.

The catalog contains a complete listing of the various sizes, styles, and shapes in which the bearings are available, and recommends the proper uses for each model. A section is included on other Gatke products—molded fabric shapes, rollers and gears, asbestos frictions and brake linings, and asbestos clutch facings.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 56.

Celotex Elects Officers

Bror Dahlberg, founder and President of The Celotex Corp., has been elected Chairman of its Board of Directors. Otis S. Mansell has been selected as its President. Other positions filled at the recent election include: Carl G. Muench to the position of Senior Vice President; Chris L. Christensen as Chairman of the Executive Committee; and Henry W. Collins as Executive Vice President.

The Heavy Duty MARION

111-M 3½-4 cu. yd. shovel



MARION

POWER SHOVEL CO.

MARION, OHIO, U. S. A.

Country's Highways Hit Hard by Winter

Nationwide Survey Shows Frost to Be Chief Cause Of Damage; Southeastern Roads Affected Most

MAINTENANCE forces of the country's state highway departments were faced this year with probably the worst road conditions in modern times. A severe winter with heavy snows and long cold spells descended over most of the United States. Highway-department budgets were strained to finance the big snow-removal and ice-control job. And the restoration of roads damaged by the harsh winter weather is a continuing project, still unfinished.

Maintenance costs have risen sharply. More equipment and men were used in snow removal and ice control than in other years, while the cost of the spring and summer repair program still cannot be totaled. For the most part, state forces are doing this repair work, though a few states are handling some of their maintenance by contract. The neglect of maintenance during the war period undoubtedly weakened the roads, and was a contributing factor in many a failure.

A nationwide survey of the country's state highway departments by CONTRACTORS AND ENGINEERS MONTHLY reveals that frost heaving, which caused pavements to buckle and crack with resultant holes and "boils", was the principal cause of the damage. Snow and cold weather by themselves did not seriously affect the highways; the freeze-thaw cycle was the chief wrecker.

Most of the damage occurred to low-cost bituminous or dirt roads, but no type of pavement was immune to failure. High-type bituminous-concrete and portland-cement-concrete pavements suffered the least. Where soil mechanics played a part in the design and construction of adequately drained foundations and base courses, the roads stood up much better and the damage was considerably less.

Damage Widespread

No section of the country entirely escaped damage to its road system. While the prolonged cold waves and record-breaking snows were felt primarily in the northeast, the most widespread damage occurred to the roads in the southeastern states. Dixie experienced one of the worst winters of the twentieth century, with an extraordinary amount of precipitation. Some of the heaviest damage was in southeastern Georgia and northern Florida after the two-day torrential rainfall of March 31 and April 1 which touched off floods over a wide area.

The far-western states experienced a mild winter, with rainfall considerably under normal, particularly between the months of December and March. However, after March 1 the rain and snowfall, especially the latter, were greater than average. The mountain areas of California have had some 12 feet of snow since March 1. Washington, Oregon, and Idaho also had these heavy late-spring snows. At the end of May a sudden thaw in the mountains sent a wall of water rushing down the Columbia River, causing widespread flood damage in the Vancouver, Wash., and Portland, Oreg., sector. Roads and bridges in the area took a drubbing from the waters.

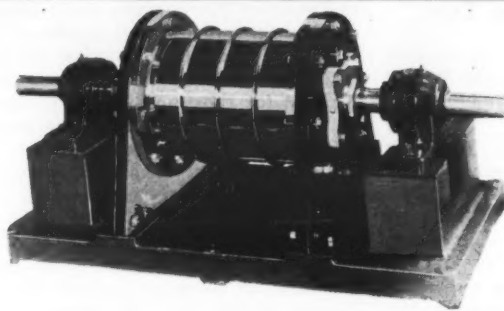
The South

From Virginia in the upper south to Mississippi in the deep south, the heavy rains and deep frosts were hard on the low-cost bituminous and dirt roads.

Some of these southeastern states had snow-removal and ice-control costs running up to two and three times those of a normal winter. To lessen the damage to the roads during the spring, a few states imposed load limits on trucks. Virginia, with good cooperation from truck operators, limited its main arteries to 17 tons, its primary roads of less importance to 12 tons, and all secondary roads generally to 8 tons. Arkansas reduced axle loading 50 per cent for a 30-day period during the spring, permitting only 9,000 pounds per axle instead of the usual 18,000 pounds.

In Virginia, soil mechanics plays a very important part in low-type roads. Roads that had been built under close control and had been thoroughly compacted by traffic before winter, showed

(Continued on next page)



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No. 37

Use water instead of costly fuel to liquefy your asphalt.

You can manufacture your own emulsion
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you'll NEVER make it!

So you're rushing to see EVERYTHING at the ROAD SHOW? Better slow down, Mister . . . you'll never make it in a month of Sundays! Too much to see, to hear, to talk about . . . too many old and new friends to greet . . . too many prospects and customers who want to "talk turkey."

So why not plan your time selectively! Seek out the exhibits that will benefit your business . . . your interest in building better roads will lead you first to RIDDELL.

Here you'll see the brand new WARCO Motor Grader . . . with valuable engineering advances. Inspect, too, the heavy-duty HERCULES Road Rollers. Meet our domestic and export representatives.

Yes, your time will be profitably invested with RIDDELL . . . your confidence well placed in WARCO and HERCULES.

See you at Soldier Field July 16 to 24

Space No. 3209A-3220

THE W. A. RIDDELL CORPORATION • BUCYRUS, OHIO

a considerable advantage over some of the older types of roads on which definite restrictions had not been used during construction.

North Carolina estimates the damage to its roads from the severe winter at around \$4,000,000. Most of this damage was caused by saturated subgrades and frost action. Snow melting on the shoulders, and side ditches filled by material that sloughed off the banks, contributed to the failures. Concrete pavements pumped more than usual, and additional failures from that cause are expected to appear later. Bituminous subsealing and shoulder drains are planned to help remedy the latter condition. Pavement damage was repaired in a hurry by patching, but that is of a temporary nature. Permanent repairs will be done as time and weather permit.

From last October to March, 1948, South Carolina reports the worst autumn and winter conditions since the State Highway Department was organized. November, usually the driest month, exceeded all rainfall records and was followed by the rainiest months of any winter. Freezing weather accompanied the rain, and the roads of the state were occasionally covered with ice for three days at a time. Damage to the unimproved roads is being repaired by ditching, reshaping, and adding surface material where needed. State maintenance forces are doing the work. This year the Department plans to put down about 500 miles of bituminous resurfacing by contract; most of this will be hot-mix asphaltic concrete.

Failure of pavement edges in the outside 3 to 4 feet was noted by Alabama, which is patching and overall-surfacing from 150 to 200 miles of roads this year. Mississippi rushed the gravel resurfacing of its low-type roads to keep them open to traffic, and spread out the repair of its higher-type surfaces. In Kentucky the damage had a greater dollar extent than at any time in the history of the Highway Department, with pavement repairs estimated at some \$7,000,000, or \$4,000,000 more than would have been expected after a normal winter. To this may be added \$1,500,000 to \$2,000,000 for the repair of other damage including slides, slips, and further shoulder and ditch work.

The Northeast

Way down east in Maine the winter was not unusual, and the roads were left in better shape than in previous years. Load limits were applied to secondary roads—8 tons for a two-axle truck; 9 tons for a three-axle truck; and 9½ tons for a two or three-axle truck with semi-trailer. Massachusetts, though faced with a huge snow-removal bill, suffered no special damage, and withheld overweight permits during the period when the frost was coming out of the ground. The Bay State has always used gravel foundations in constructing its roads, and therefore the damage due to frost heaving or frost boils was not serious. Connecticut reported deep frosts under pavements that were kept free of snow, while roadsides with heavy snow cover had very little frost, though an extremely high water table was thereby created.

The New York City snowfall broke long-time records, but in the rest of the state the fall was below average. The continued cold in New York caused more frost heaves than ever before, damaging the oldest and structurally weakest low-cost bituminous pavements. New Jersey came through the winter in good shape as a whole, but experienced considerable damage to bituminous surfaces from the excessive use of tire chains.

Pennsylvania's highways were in fair shape after the winter, but the farm-to-market roads, which are subjected to heavy hauling from mine-stripping operations, suffered severely. Frost likewise damaged the flexible-type roads

to a considerable degree.

Midwestern States

In Wisconsin, Illinois, Indiana, Michigan, and Ohio—the states rimming the Great Lakes—the damage due to the winter weather was not excessive as compared to previous years. Frost, penetrating to considerable depths in Wisconsin and Michigan, damaged gravel and low-cost bituminous surfaces in a greater measure than in the neighboring states.

Minnesota, a winter state, experienced more frost heaves than usual, but noted that where heaving occurs under rigid paving such as concrete, the slab cracks up if the heaving is uneven. Where heaving occurs under so-called flexible-type roads, consisting of gran-

ular bases with bituminous surfacings, the cracking is not so pronounced nor so destructive. Maintenance engineers say that it is not the frost that damages

the highways, but the traffic using the highways after the frost has weakened them. The damage bill can be lessened
(Concluded on next page)

for Heavy-Duty Hauling!



MILLER
TILT-TOP
MACHINERY HAULING
TRAILERS

Model B

Miller trailers are made to fit every hauling requirement, with 3½ to 10 ton models! "Bulldozer" type shown in illustration will handle International TD-9 with Bulldozer blade. Model "B" for narrow, heavy units like steam rollers. Easy loading under all conditions. Winch optional on all models. NEW! 2-way hydraulic tilting control optional.

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4320 W. Martin Drive, Milwaukee 8, Wisconsin
Retail Prices: \$433 to \$825 for complete trailers f.o.b. Milwaukee, Wis.
Write for complete details and price lists!

LAPLANT-CHOATE MOTOR SCRAPERS...

*Mike Radich & Co. average 94.2% efficiency
over a thousand hour period.*

The two Motor Scrapers being operated by Mike Radich & Co. of Burbank, California recently completed a 1028-hour operating cycle with only 60 hours of down-time. Based on 50-minute hour operating efficiency, that's equivalent to a 56.5-minute hour or a bonus of over a full hour on a 10 hour day.

During one phase of the operation, the two Motor Scrapers handled 5000 yards of in-place-sand in 10 hours over a 1200 foot round-trip haul.

Records like this are typical of Motor Scraper performance throughout the country handling all kinds of material. Combined with the new low price of LPC Motor Scrapers, their high operating efficiency means still lower costs and more profit for you.

Ask your nearest LPC distributor for full details today. Request Booklet A-1154. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, California.

**gain
an
extra
hour per
day!**



LAPLANT CHOATE

HIGH SPEED EARTHMOVING EQUIPMENT

Country's Highways Hit Hard by Winter

(Continued from preceding page)

by controlling highway use during the critical period. During the last session of the Minnesota Legislature, a law was passed reducing legal axle loads from 9 tons to 4 tons on all highways except trunk highways from March 20 to May 15.

Minnesota has been conducting full-scale bearing tests on finished roads, and on the subgrade soils supporting them, in order to determine how much supporting strength is lost at the time that frost is leaving the ground. Indications are that most soils, regardless of the composition and/or texture, lose about 50 per cent of their carrying capacity at that time. This carrying capacity is recovered about 30 days after the ground has completely thawed.

Surface break-ups in Missouri on the thinner types of pavements were corrected by blading, restabilizing the base, and retreating the surface when the base had been restabilized and was dry. The bituminous roads carrying a greater depth of stabilization were subject to less damage than the roads which have thinner stabilized bases.

Damage to roads in Texas will amount to around \$5,000,000. A report from that state indicates that flexible bases treated with either cement, lime, or asphalt stood the winter weather considerably better than the flexible bases where the plasticity index was towards the limit of 15.

Far-Western States

Nevada experienced a very mild winter with approximately 50 per cent less snowfall than normal. Only minor damage to the roadway was caused by frost action. Before Nevada highways are designed, a careful soils investigation is made, and plans are prepared in accordance with recommendations from the materials and research engineers. Such road surfaces where soil mechanics have been considered have stood up much better than roads where the subject is by-passed.

Idaho reports in a similar vein, saying that highways where soil mechanics were employed and well controlled showed little or no effects of the winter, compared to those without this control. This State posted load limits and maximum speeds, but without adequate checking stations no effective control was accomplished.

Summary

The overall picture indicates that, despite the increased activities of highway maintenance departments, the repairs to roads damaged by the severe winter will take longer than in former years, and will cost more. Alternate periods of freezing and thawing which accompanied the abnormal precipitation in many states were the cause of much of the damage—rather than heavy snow alone. All agree that low-cost-type pavements suffered the most, and higher types the least. Many feel that soil mechanics played a large part in keeping roads in shape despite the tough winter.

Front-End Loader Has 8-Foot Capacity

A light-duty front-end loader is made by the Arrow Contractors Equipment Co., 2020 Walnut St., Chicago 12, Ill. It is recommended for loading and hauling cement, sand, gravel, earth, and other loose materials. It has a lifting capacity of 1,200 pounds and a volume capacity of 8 cubic feet, struck measure. Dumping clearance is 4½ feet, permitting its use in loading power wheelbarrows, dump carts, mixer skips, and other equipment.

A caster-type rear wheel allows the



This new Arrow Scooter-Loader is designed for handling gravel, sand, cement, and other loose materials. Lifting capacity is 1,200 pounds.

Scooter-Loader to turn in its own length. The transmission provides four forward speeds and one reverse. Maximum forward speed is 15 mph. Power

is provided by a 9-hp air-cooled gasoline engine. The unit uses pneumatic tires on all three wheels.

Further information may be secured

from the company or by using the enclosed Request Card. Circle No. 59.

Hydraulic-Equipment Line

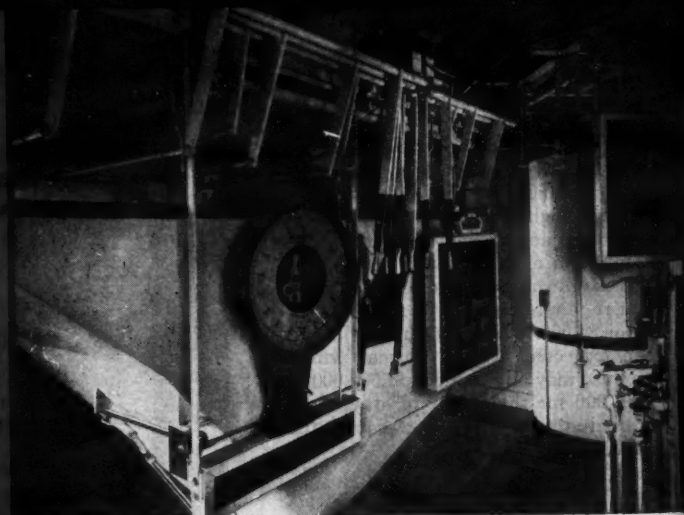
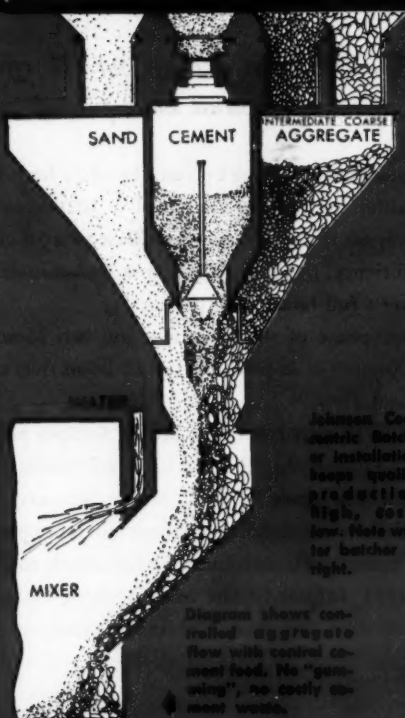
Literature describing its line of hydraulic equipment is being distributed by the Hydro-Power Division of The Hydraulic Press Mfg. Co., Sheridan and Belmont Aves., Springfield, Ohio. This line includes the Ten Ton Tony hydraulic unit, the Cubline gear pumps and valves, piston-type pumps, and hydraulic boosters.

Each of these units is described in a separate folder which lists its principal features. Drawings and photographs illustrate the construction and operation of each of these units, and point out its major dimensions. Miscellaneous information includes applications, performance data, and listings of the sizes and styles in which each type of accessory is made.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 91.

JOHNSON CONCENTRIC

GIVE YOU CENTRAL CEMENT



Exclusive Concentric Feature Prevents Costly Cement Loss, Pre-Shrinks

Only with the Johnson patented Concentric Aggregate-Cement Batcher can you get all of these advantages for fast, efficient, economical operation:

1. Centralized control provides easy and fast operation.
2. Batching cycle time is reduced by fast charging and discharge of batchers.
3. All ingredients are intermingled as they flow through discharge.
4. Materials are pre-shrunk and dusting reduced.
5. "Gumming" is eliminated.
6. Cement, concrete's most expensive ingredient, is weighed on separate scale in individual centrally located cement batcher and further protected from loss by concentric arrangement of aggregates around the cement batcher discharge.
7. Adjustable rate of discharge of each aggregate from batcher gives better control of ribbon feeding.
8. Dual discharge is available . . . no separate collecting cone.
9. Extra steep bottom slopes prevent hang-up.

Let your Johnson distributor show you how these features can increase your plant production and lower costs.



THE C. S. JOHNSON COMPANY

Feature of Grader Is Tubular-Frame Design

A 50-hp motor grader is announced by the Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee, Wis. This new Model BD grader is powered by a General Motors 2-cycle Series 71 diesel engine. The transmission provides six speeds forward ranging from 1.30 to 14.69 mph, and three reverse speeds ranging from 1.55 to 5.41 mph. The BD transmission, tandem drive, front wheels, and other assembly units are interchangeable with the heavier Model AD grader.

Among the features claimed for the Model BD grader are tubular-frame construction, enclosed controls, Roll-Away moldboard, precision adjustment of the blade from the operator's platform, electric starter and lights, center-control steering, smooth front hub caps, and adjustable front-wheel lean.

The Roll-Away blade is designed to roll the dirt and let it fall away without packing it down. Blade maneuverabil-



This is the new Allis-Chalmers 50-hp Model BD motor grader. Tubular-frame construction, a Roll-Away moldboard, and precision blade adjustment are among its features.

ity provides a 26-inch clearance from the cutting edge to the circle. The front-axle clearance is listed at 22 inches.

Other features include greater visibility from the operator's platform,

fewer grease points for faster lubrication and maintenance, and a mechanical system of circle control said to enable the operator to obtain exact settings that are not easily disturbed.

Further information may be secured

from the company, or by using the enclosed Request Card. Circle No. 106.

Missouri Basin Dam Is Opened Officially

The first major flood-control dam and reservoir unit of the broad Pick-Sloan river-harnessing program in the Missouri Basin was formally dedicated on Decoration Day. Kanopolis Dam was first authorized by Congress in the Flood Control Act of 1938, and is designed primarily for flood control on the Smoky Hill and Kansas Rivers. The reservoir at present has about 900 acres under water. When it rises to normal operating pool level, it will cover 3,500 acres, creating a lake 12 miles long with a 30-mile shore line.

The dam is 730 feet wide at the base, 25 feet wide at the crest, rises 131 feet above the bed of the Smoky Hill River, and is 3 miles long. Into it went 14,668,000 cubic yards of earth and 173,400 cubic yards of stone facing. Construction of the spillway required excavation of 2,700,000 cubic yards of earth, and the placement of 19,000 cubic yards of concrete and 300 cubic yards of stone riprap.

Kanopolis Reservoir has a storage capacity of 400,000 acre-feet for use during high-river stages to prevent flooding downstream from the dam. The normal volume of water retained in the reservoir—which is primarily for the purpose of supplementing low flows in the Smoky Hill and Kansas Rivers—is 50,000 acre-feet.

Water released from the Kanopolis Dam will flow through a concrete tunnel 14 feet in diameter and 2,443 feet long. Controlled flow through the tunnel will be regulated by two gates located at the upstream end of the conduit. The reservoir capacity is adequate to impound the largest flood which might reasonably be expected, exceeding any of actual record. However, a fixed-crest spillway, 500 feet wide at the control section, has been provided for passing extreme flood waters.

Work on the dam was started in December, 1940, but was halted in 1942 by the war. The project is part of the Pick-Sloan Plan under the 1944 Flood Control Act, which gave the Missouri Basin a comprehensive river-control and development program. The first post-war contract was awarded in April, 1946.

The dam is one of 105 reservoirs included in the program to be used for flood control, irrigation of nearly 5,000,000 acres of land, navigation, production of 10,000,000,000 kilowatt-hours of electricity annually, and other public benefits. A master recreational plan for the reservoir area is under study by the Corps of Engineers. It will provide recreational facilities in the form of fishing, boating, camping, swimming, etc., in addition to its primary purposes.

The Corps of Engineers is building four other large control reservoir projects, two of them on the Missouri River. Of these, the Garrison Dam in North Dakota, now in its third year of construction, will be the largest compacted-earth dam in the world. The Bureau of Reclamation is also building a number of tributary irrigation dams in the basin program.

The Missouri River Division Engineer is Major General Lewis A. Pick, originator of the basin river-control plan.

N. Y. Stud Welder Engineer

Walter E. McArthur has been appointed as New York resident field engineer by the Nelson Stud Welding Division of the Morton-Gregory Corp. Mr. McArthur will handle this line of stud-welding equipment, be located at 220 E. 42nd St., New York City, and will be available to render increased service to users of stud-welding equipment in that territory.

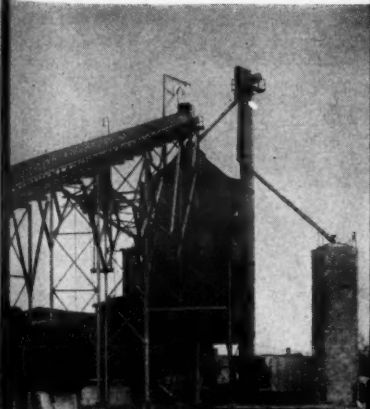
BATCHERS

FEED



This efficient aggregate and cement-handling plant is built around a 314 cubic yard Johnson Octo-Bin. You'll see these bins used in successful concrete plants the country over.

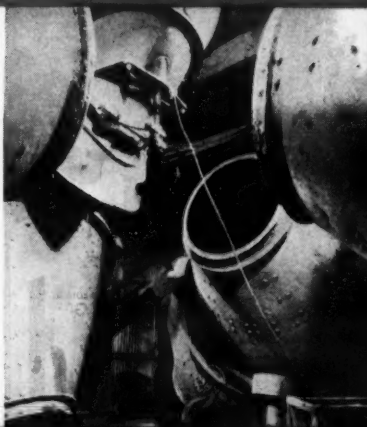
Modern 314 cubic yard combination Central Mix and Concrete Products Plant. More than 100,000,000 cubic yards of concrete have been poured by job-tested Johnson plants.



KOEHRING SUBSIDIARY
CHAMPAIGN, ILLINOIS

20,000 yards in one 24-hour period

Eight 4-yard Koehring Concentric Zone mixers in the Johnson Central Mix Plant at Grand Coulee poured a record 20,000 cubic yards of concrete in one 24-hour non-stop period, after pouring 5,000,000 cubic yards prior to the record run. From midnight to midnight, these mixers never stopped once.



KOEHRING COMPANY MILWAUKEE 10, WISCONSIN

Every batch a perfect mix

Improved mixing action of the revolving drum of the Kwik-Mix 16-S Dandie mixes every batch of concrete for perfect texture. You get better concrete because every particle of the aggregate is completely cement-coated. Same thorough mix in all Kwik-Mix Dandie mixers including 3½-S, 6-S, and 11-S sizes.



KWIK-MIX COMPANY PORT WASHINGTON, WISCONSIN
KOEHRING SUBSIDIARY

Sidesteps side obstructions

Boom of the Parsons 221 Trenchliner* quickly and easily rides on rollers from side to side across the full width of the Trenchliner. That's why the Parsons 221 Trenchliner can cut a trench as close as 10" from side obstructions. Trenches up to 8' depth, 16" to 36" wide.



*Reg. Trade-mark

PARSONS COMPANY NEWTON, IOWA
KOEHRING SUBSIDIARY

Financing Can Help Build More Highways

An Outline of Plan for Contractors And Dealers to Finance Purchases Of Equipment or Company Expansion

By E. T. NEVILLE*

† CONTRACTORS and distributors are faced with an ever-present need for working capital. No matter how successful a business may be, it is frequently true that if additional funds were available, larger profits would accrue. This article discusses, for contractors and distributors alike, how profit-making opportunities can be created, and explains one way in which purchases and sales of equipment can be financed.

Contractors' Problem

First, let's take up the contractor's problem. Generally speaking, he requires financing for either of two purposes: first, to acquire additional equipment; second, to put into effect plans for some form of expansion.

Let's look at a hypothetical case involving a contractor who needs additional working capital. We'll call our friend Contractor Blank, and assume that he has been awarded an important road-building contract. Before starting work, he needs additional equipment to handle the job expeditiously, so he sets about acquiring several pieces of machinery involving a cost of \$75,000.

In negotiating the purchase with his distributor, he finds that extended terms can be arranged, and that he can obtain delivery upon making an initial payment of 25 per cent of the selling price. This means that he will have to invest only about \$19,000 to secure immediately the machinery he needs to push his job to speedier completion. This extension of credit solves the first problem and Contractor Blank is ready to plan the next step.

The second problem concerns the unpaid balance of \$56,000 and a plan to amortize this amount is needed. Two courses are open to him: one, to borrow the necessary amount from some financing organization; the other, to make the necessary arrangements directly with the distributor. In either case, the end result will be the same. He is seeking, and can obtain, time in which to liquidate the balance.

Payments from the contract on which the machines are to be used will be ample to warrant making the required down payment and to meet a series of monthly payments which will retire the obligation within a year. On this basis, the transaction can be concluded and the contractor can avoid the risk of placing too heavy a strain on his working funds.

Situations often arise where the investment of more capital to effect an expansion will pay substantial dividends. An example is a concern which had an opportunity to acquire a competing company. The amount of cash needed to swing the deal was larger than it could safely withdraw from current funds without interference with the operation of the business. By using the resources of a financing organization, the firm quickly raised the money needed and was able to complete the merger without straining its financial resources.

Today, this construction company successfully bids on major projects because it maintains a fine fleet of equipment and has the facilities necessary to handle difficult jobs properly. Larger profits, accruing as a result of the merger, made it relatively easy to repay

the original loan. Since that time it has financed many thousands of dollars worth of new equipment by using outside capital for such purchases, thereby conserving its own funds for operating purposes.

To one contractor, an investment of a few thousand dollars means a great deal; to another, equipment purchases can run into six figures and still be within his means. In both cases the problems are identical and resolve themselves into this question: "How much can safely be tied up in an initial payment and how large should each monthly instalment become?" A financial organization familiar with such problems is in a position to provide a helpful solution.

By spreading payments for purchases

of construction equipment over extended periods, contractors are able to maintain the liquid-cash position necessary to meet running expenses. It should never be overlooked that payrolls, taxes, insurance, supplies, and the numberless items of expense that go into a construction job place a heavy strain on working budgets.

Conserving cash to meet these obligations promptly is a "must" which every successful contractor endeavors to include in his planning. Experience has shown, time and again, the wisdom of this kind of foresight. By buying equipment out of income, it is possible for contractors to acquire the mechanical help they need and still keep enough cash on hand to meet day-to-day expenses readily.

Distributor Financing

Distributors of construction equipment have to meet financing problems similar to those which confront their contractor customers. They have to buy equipment and frequently stock it and store it for many months before it can be converted into cash. The importance of keeping their funds liquid is obvious, because they also have other cost-of-doing-business expenses to meet which call for the continued use of substantial amounts.

As a group, distributors are keenly aware of the importance of conserving working funds to carry on their activities. Any sound financing plan that will help them to handle an increased sales volume without tying up their capital

(Concluded on next page)

Don't miss this...

CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

INTERNATIONAL

*The author of this article is National Sales Director, C.I.T. Corp., sponsor of the C.I.T. Construction Equipment Financing Plan.

is of more than passing interest.

Let's look at such a plan for distributors and see how it works. We'll call this company John Doe Distributors, Inc. It has been established for several years and serves an area in which are located contractors who handle a large volume of road construction. In order to keep pace with inquiries for different types of equipment, Doe Distributors finds it increasingly advisable to carry a more comprehensive stock. Keen competition has to be considered too, so by having ample equipment on hand to demonstrate and deliver, it can make many additional sales.

The first problem is how to finance instalment sales. Its capital structure, while adequate for normal needs, is not sufficient to handle a growing vol-

ume of time-payment transactions. The need for some type of financing is clearly indicated. One means is accommodation through an organization which provides facilities for financing instalment sales of construction equipment.

After negotiations with such a company are concluded, Doe Distributors finds that it can readily deal with frequent requests for credit. Some contractors want to buy equipment but want to pay for it out of income. It would overtax Doe's working funds to attempt to carry the instalment paper, but an agreement can be worked out whereby the financing organization will buy this paper as it is created.

This retail financing arrangement can make it possible for the dealer to grant credit to responsible contractors and

then turn the time-payment sales into cash transactions. The financing organization handles all collections and, where requested, passes on the credit of the purchaser. As a result, by keeping its capital liquid, Doe can handle more business without increasing its capital investment.

Road Show—an Opportunity

This month, the newest and most highly developed models of every conceivable type of construction machinery will be on display at the Road Show in Soldier Field, Chicago. Contractors from all over America will visit this exhibition with the intention of purchasing equipment to carry on their business to best advantage. To some, the cost involved will present a problem. How-

ever, it will be possible to negotiate these purchases on terms which permit the buyer to spread the cost over extended periods.

Financing is available for this purpose, and contractors and distributors alike can obtain financial assistance from organizations who are ready and willing to place their resources at the disposal of responsible concerns. This instalment-sales financing can be of material aid in promoting the purchase and sale of the construction equipment needed to build "Better Roads for a Better World".

Dump-Trailer Line Includes Five Models

A line of heavy-duty dump trailers is made by the Landis Steel Co., Picher, Okla. They come in sizes with truck capacities of 9, 12, 16, and 18 yards. The Landis 9-yard mechanical bottom-dump trailer has an overall length of 16 feet 3 inches, width of 8 feet, and height of 6 feet 7 inches. The door opening is 36 x 52 inches, and is designed to permit the quick shedding of large boulders and road chunks.

The 12-yard Air-Dump trailer is 20 feet 3 inches in overall length, 7 feet high, and 8 feet wide. It has two doors which open by gravity to 18½ inches x 8 feet 4 inches, and are air-closed from the truck cab. The model is especially recommended by the manufacturer for hauling fine materials.

The 16-yard trailer has a length of 22 feet 6½ inches, a width of 9 feet 4 inches, and a height of 7 feet 6 inches. It is of the end-dump type, and the bed is raised by an 8-inch twin hoist. The 18-yard trailer is made in two models—single or tandem rear axle. The single-axle model is 22 feet 9 inches long, 7 feet 9 inches high, and 8 feet wide. The bottom-dump doors open to 3 feet 6 inches x 8 feet, clear. The tandem-axle model is 23 feet 9 inches long, 8 feet high, and 8 feet wide. It has a 2-door opening which measures 1 foot 8½ inches x 11 feet 9 inches. Doors open by gravity and are closed by air from the truck cab.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 5.

Scrapers, Rippers, Etc.

Literature covering its line of construction equipment can be obtained from The Slusser-McLean Scraper Co., Sidney, Ohio. This equipment includes scrapers in 3, 5, 6, 8, 10, and 12-cubic-yard capacities, road rippers, terracers, rotary drag scrapers, power-control units, and tamping rollers.

The literature describes each piece of equipment in detail and points out its principal features. Photographs illustrate each unit and show it in use. Drawings show various operating positions. Complete specifications, dimensions, and other relevant data are also included.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 31.

Japanese Form AGC Group

The contractors of Japan have organized themselves into a unified group along the lines of The Associated General Contractors of America, Inc. The Japanese organization has adopted the name of The Associated General Contractors of Japan. It was established last March with the assistance of the U. S. Army.

The previous Japanese contractors' association was found unsatisfactory since the reorganization of Japan as a democracy. The AGC of America sent copies of its Governing Provisions, Code of Ethical Conduct, outline of its organization and work, and other material, from which to "teach, assist, and lead" the new group.

...the SHOW OF THE ROAD SHOW

The greatest display of road building power and matched equipment which International Harvester has ever exhibited is yours to examine... at close hand... in the Show of the Road Show, Soldier Field, Chicago, July 16 to 24.

80,000 square feet of the concourse next to the stadium, filled with International crawlers, wheel tractors and power units, provide the opportunity of the year. See the power and machines which are now becoming more and more the mainstay of road builders' equipment throughout the land. Many of the giant TD-24's will be there—with matched equipment.

Come, be the guests of International Harvester at this greatest of road shows... and get acquainted with the performance and cost-saving features of the greatest line of powered machines on earth.

Industrial Power Division
INTERNATIONAL HARVESTER COMPANY
CHICAGO 1 ILLINOIS

Industrial Power





This Tracto-Shovel, mounted on an Allis-Chalmers HD-5 tractor, excavated a bed for the new track which was laid to take the Freedom Train during its stay in Chicago, July 5-9.

Special Track Laid For Freedom Train

When the Freedom Train came to Chicago, it moved onto a new track built especially for it just south of Soldier Field. The track was laid in an excavation built by Halber Peterson using a Tracto-Shovel mounted on an Allis-Chalmers HD-5 tractor. The use of the machine and the services of the operator were donated by the Kennedy-Cochran Co. of Bellwood, Ill., a suburb of Chicago.

The excavation was started on a Tuesday, and was completed the following day. Three trees along the line of the excavation were moved in the process of digging. The excavation measured 225 feet x 12 feet x 19 inches. The entire project was under the supervision of Evan I. Kelly, Director of Special Services, Chicago Park District.

Air Runs Generator

An air-powered generator is now being produced by the Ingersoll-Rand Co., Phillipsburg, N. J. The Model AL-150 Airlite is designed to supply enough current to light two 75-watt 115-volt bulbs. It is especially recommended by the company for use in tunnels and other places where air tools are used, since it permits the use of one power source and eliminates the need for running in electric-power lines.

According to the manufacturer, the Airlite cannot be harmed by short circuits or overloads. And should the output terminals be shorted, light is restored as soon as the short is removed. The Airlite Model AL-150 weighs 8½ pounds, and measures 7¼ x 5 x 5 inches. It is also available in a 220-volt model.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 2.

Rubber Platform Mats

A rubber floor mat for use by men who must stand in one spot for long periods of time is available from the Waterloo Foundry Co., Waterloo, Iowa. The Foot-Rest is a thick, soft rubber mat which can be attached to the platform of a tractor, stationary engine, etc. According to the manufacturer, the Foot-Rest eliminates jar and fatigue from standing on hard surfaces, and the specially designed safety tread gives maximum traction to prevent accidents caused by slipping. Size of the mats is 12 x 6 x 1 inch. They are attached with ¼-inch cap screws.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 117.

Decals for Identification

A broadside explaining several uses for its decals has been prepared for distribution by The Palm Bros. Decalcomania Co., Dept. 29, 3730 Regent Ave., Cincinnati 12, Ohio. It features a description of the versatility of decals, explains how they are applied, and lists the advantages of using them.

The broadside illustrates the many types of decals which the company

makes, and their uses.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 19.

Catalog on Line of Blocks

A complete line of blocks and specialty equipment is described in a new catalog, No. 48, issued by the McKissick Products Corp., P. O. Box 2496, Tulsa, Okla. Among the items listed in this 48-page catalog are many types of sheaves, construction blocks, floor blocks, snatch blocks, loading blocks, and wire-rope blocks. These include blocks with hooks, blocks with shackles, diamond-pattern blocks, and others.

Each type of device is described in detail, and specifications are listed for each of the models and the sizes in which it is made. The bulletin points out special applications of each unit, its features, and its price.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 114.



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Now Caine Corr-Plate Steel can be ordered in a new steel alloy which gives it 100% greater corrosion resistance. This practically doubles the service life of your piling. Tests also prove this new alloy to be 25% stronger, giving you equal strength in a 25% lighter piling.

Caine Corr-Plate Steel Piling can be

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The world over, Caine Corr-Plate Steel Piling is being used for Foundations, Dams, Retaining Walls, Docks, Levees, Bulkheads, Sewers, Disposal Plants and hundreds of other jobs.

Now, More Than Ever Before...
STRONGEST Per Pound Weight

2894

CAINE STEEL COMPANY

Steel Piling Division, 1320 N. Central Avenue, Chicago 19, Illinois



What is Dependability?

Booth 1011...
Cummins at the Road Show



When you get right down to it: what is a dependable diesel?

It's an engine that gives reliable, day-after-day operation with minimum maintenance... the kind of operation Claude Fisher Construction Company, Los Angeles, Calif., gets from Cummins Diesels.

Working on a project which involves moving nearly six million yards of desert sand, this contracting firm is using six Wooldridge Terra-Cobras powered with Cummins Diesels.

After three months of operation, working under severe desert conditions, the job has progressed so far ahead of schedule that four months have been cut from the contractor's original estimated time for completion.

CUMMINS ENGINE COMPANY, INC.
COLUMBUS, INDIANA

This Wooldridge Terra-Cobra, powered with a Model HBS-600 Cummins Diesel Engine, is used by the Claude Fisher Construction Company, Los Angeles, Calif.



Pulverizing Plant Has Large Capacity

A large-capacity pulverizing plant has been developed by the Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee, Wis. It is designed to produce upwards of 170 tons of material per hour, with 90 per cent or more passing a No. 8 mesh screen.

The size of the machine is 32 x 48 inches, and it requires about 320 hp to produce at the rate of 170 tons per hour. The feed opening is 22 x 50 inches to permit the passage of large rocks for primary-crushing purposes.

One of these machines is pictured in use on a job near Cottage Grove, Wis. This particular machine is powered by two Buda Model 8DC1125 engines developing 320 hp. According to Lippmann, this unit produced 10,000 tons of material before it required a new set of hammers.



One of the new Lippmann rock-crushing pulverizing plants is pictured mounted on a portable trailer on a job near Cottage Grove, Wis. As shown here, it is powered by two Buda engines developing 320 hp together.

Further information on this pulverizing plant may be secured from the

company, or by using the enclosed Request Card. Circle No. 103.

Snath for Scythes

For trimming roadside weeds and grass around trees, posts, and other locations where hand-cutting is necessary, a new all-purpose scythe snath has been announced. It is a product of the Kavanagh Co., Inc., 334 N. Ogden Ave., Chicago 7, Ill. The Kavanagh snath is made from 20-gage steel tubing, is 5 feet long, has a 1½-inch outside diameter, and weighs 3½ pounds.

The nibs on the Tru-Balance snath are made rigid by bolting through the tube, and are reinforced with fibre sleeves. The blade clamp is reinforced by steel, and is said to make the blade a solid extension of the snath. The blade is connected by a 5/16-inch U-bolt made of Speed-Case steel.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 118.



Miracle on Wheels

Sand Dunes—deep mud or snow—steep hills or mountain grades . . . all are one and the same to Marmon-Herrington *All-Wheel-Drive* Trucks.

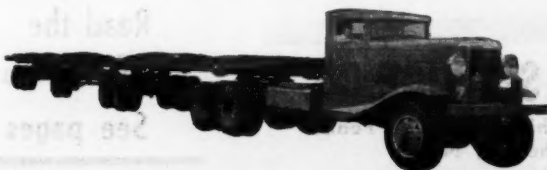
Marmon-Herrington *All-Wheel-Drive* Trucks give you tremendous tractive power—where you need it, when you need it. With front wheels pulling, rear wheels pushing, these great trucks are "made-to-order" for really tough trucking jobs—jobs too difficult or altogether impossible for trucks of conventional drive.

In Marmon-Herringtons you will find the world's most complete line of *All-Wheel-Drive*

trucks. There are several regular models—both 4-wheel-drive and 6-wheel-drive—with G.V.W. up to 42,000 pounds. In addition, Marmon-Herrington converts all standard Fords to *All-Wheel-Drive*—available in a wide range of 4-wheel-drive and 6-wheel-drive models, with G.V.W. from 4,700 pounds to 35,000 pounds.

Get the complete facts on these great *All-Wheel-Drive* trucks. Ask your nearest Marmon-Herrington dealer for an on-the-job demonstration of their amazing performance ability, or write direct for illustrated literature.

MARMON-HERRINGTON COMPANY, INC., INDIANAPOLIS 7, INDIANA



MARMON-HERRINGTON
All-Wheel-Drive

Heavy-Duty Diesel Is Rated at 300 Hp

A heavy-duty 6-cylinder diesel engine is announced by the Waukesha Motor Co. of Waukesha, Wis. It is rated at 300 hp at 900 rpm when stripped, or at 281 hp at 900 rpm when rigged as a complete radiator-cooled power unit. Maximum output of the stripped engine is said to be 330 hp at 1,050 rpm, and 301 hp at 1,050 rpm for the complete power unit. The engine has an 8½ x 8½ bore and stroke, and a displacement of 2,894 inches.

Pistons on the Model 6-LRD are cast-iron and have 6 rings—4 are of the non-sticking wedge type, and 2 are straight-side oil-control rings. A feature claimed for these pistons is the cooling of the piston crown by intermittent circulation of oil—under pressure—from the lubricating oiling system. Other features claimed for the engine include: the Waukesha diesel combustion chamber, freedom from shudder and vibration, clean burning,

ability to use fuels in a wide cetane range, fuel economy, and simplicity of maintenance.

The engine when rigged as a power unit is equipped with large-capacity waste-packed oil filters, large-capacity fuel filters, built-in governor, and an American-Bosch injection system. When desired, it can be equipped with an individual gasoline-engine starting system. Flywheels and housing ranging from SAE 00 to 1 are available, as are clutches, slide rails, safety shut-down, and other accessory devices.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 102.

Allis-Chalmers Sales Mgr.

An Assistant Industrial Sales Manager has been appointed by the Tractor Division of the Allis-Chalmers Mfg. Co. He is V. M. Holloway, formerly Northwest Industrial Territory Manager. He is succeeded in the latter position by J. M. Haile.

Lightweight Welder Delivers 180 Amps

A lightweight gasoline-engine-driven welder is announced by The Lincoln Electric Co., P. O. Box 5758, Cleveland 1, Ohio. The Lincwelder measures about 2 x 2 x 4 feet, and weighs 502 pounds. Current range is rated at from 20 to 180 amps.

Among the features claimed for the Lincwelder are these: provision on the output panel for three ranges of output current, with continuous adjustment within these ranges; generator controls mounted in an enclosed cabinet; and mounting rails for bolting to floor or platform.

The welder has an air-cooled 2-cylinder Wisconsin engine, whose speed determines the welding current. The engine delivers 13 hp at 2,300 rpm and 11 hp at 1,800 rpm.

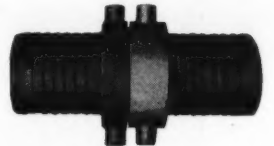
Further information on this new welder may be secured from the company, or by using the enclosed Request Card. Circle No. 41.

THESE "KINGS" ARE TOPS, in Providing Tight Water Hose Connections



"KING" COMBINATION NIPPLE
With Patented "Cor-O-Zig"
Corrugations

Fits straight end hose of same I.P.T. size; easier to attach because of smoothly rounded spiralled end; holds tighter under clamp pressure because zig-zag corrugations provide two-way gripping surface. Sizes ½" to 10".



"KING" SHANK COUPLING
For Suction and Water Hose

A reliable coupling that is absolutely uniform in quality, threading and dimensions. Quickly connected and disconnected. Made in all malleable iron; malleable iron with brass nut; or all brass. Shanks have deep, clean corrugations. Sizes 1¼" to 8".



"KING" HOSE CLAMPS
Single Bolt Double Bolt

Strong, convenient, economical. Made of malleable iron, cadmium plated. Easily attached and can be used over and over again. Tightening provides evenly distributed all-round pressure on hose. Double bolt has exclusive quadruple take-up. All sizes.

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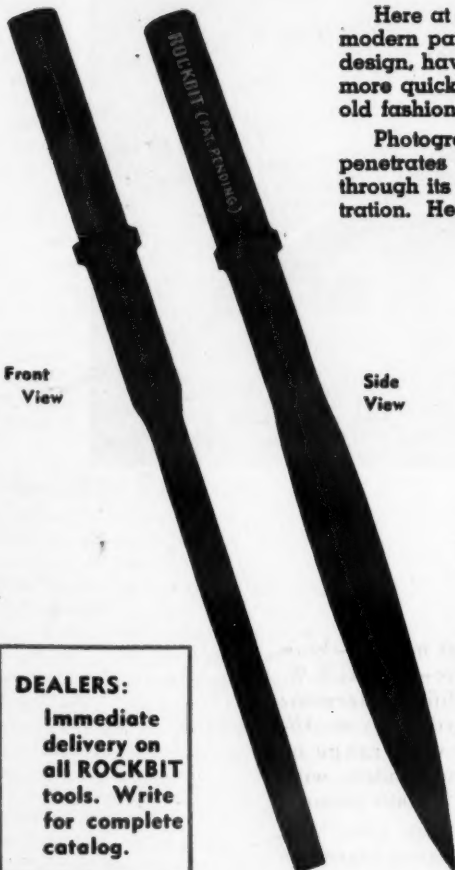
Selling Used Equipment?

Advertise it in the
"TRADING POST"
See pages 142 and 143

Buying Used Equipment?

Read the
"TRADING POST"
See pages 142 and 143

NEW MOIL POINT... Breaks Concrete Through Engineered Wedge Action



DEALERS:
Immediate
delivery on
all ROCKBIT
tools. Write
for complete
catalog.

Here at last is a moil point designed to make maximum use of the power in modern paving breakers. Rockbit Sales & Service Co., pioneers in moil point design, have developed the new *Sabur Point* to break concrete more efficiently, more quickly, and more thoroughly than has been possible with conventional old fashioned moil points.

Photographs at left show the curved shape of the *Sabur Point*. As the point penetrates concrete, this curved shape causes a sideways shattering action through its wedge-like design, thus relieving the point for its main job of penetration. Here's how the *Sabur Point* works:



Check the advantages of the new SABUR POINT:

- ✓ Scientifically designed to direct the force of impact.
- ✓ Saves money by breaking more concrete per man hour.
- ✓ Easy on the operator, less kick back. Practically impossible to stick.
- ✓ Streamlined for penetration and for splitting concrete.
- ✓ Shanks ground to exact tolerances.
- ✓ Strength where strength is needed.
- ✓ Will far outlast other points even under the toughest conditions.

Try the *Sabur Point* on your next concrete breaking job. Write for information.

ROCKBIT
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ROCKBIT SALES & SERVICE CO.
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350 Depot Street, Asheville, N.C.

State Tests Behavior Of Expansion Joints

Illinois Reports Conclusions Based On Field Investigations and 20 Years Of Experience

JOINTS were not adopted for general use by the Illinois Division of Highways until 1928. But miles of pavement have since been built in which joints of different types and materials were incorporated, and much experience has been gained. A recent issue of the University of Illinois Bulletin summarizes that experience. It reviews the data obtained from field investigations, and the knowledge gained through building thousands of miles of pavements with and without expansion joints.

Types of Joints Studied

Seven variations of the all-metal air-chamber expansion joints were studied and compared by authorities at the University; three designs of metal-sealed joints with premolded filler; open joints with poured fillers; and four kinds of premolded expansion joints without metal seals. Also, in conjunction with testing these types of joints, seventeen distinct varieties of load-transmission devices were studied. They were also compared on the bases of their total shearing strength, and resistance to opening and closing of the space between the concrete face of the joints.

Features, Defects Examined

Engineers of the Division of Highways, in their part of the investigation, emphasized field examinations of the pavements in which the joints in question had been installed and subjected to service tests.

The field study included examinations of each joint for the following features and defects: (1) Measurement of elevations at various points on the pavement surface adjacent to the joint and of the filler over the joint, to determine whether the presence of the joint influenced the contour of the surface. (2) Spalling of the edges of the concrete adjacent to the joint. (3) The condition of the bituminous premolded caps on the J-1 joints and of the poured bituminous filler on the J-2 and J-4 joints. (4) Splits or fractures in the copper top seals. (5) Type of material in the shoulders, and shoulder conditions which might have affected the joints. (6) Splits or fractures in the copper end seals, and corroded end plates. (7) Presence of water, ice, and dirt inside the joint, and available expansion space. (8) Fractures in edge of pavement adjacent to ends of joint. (9) Type of load-transmission device used and evidence of inadequate load transmission. (10) Unusual subgrade, drainage, and other conditions which might have affected the operation of the joint. (11) The condition of the premolded joint filler, width of joint opening, space between filler and concrete, and amount of dirt in this space. (12) The width of the poured joints; whether an original, a cut, or a re-cut joint; failure of concrete adjacent thereto; and condition and effectiveness of poured filler. (13) The total number of transverse cracks that had occurred between joints in every section on which joints were examined, and such features as culverts, bridges, cuts, fills, grade, and others which might have influenced the formation of cracks being observed.

Conclusions

Some of the outstanding points brought out in the discussion follow:

1. Joints are still in the development stage, and no joint or system has been developed which meets all the essential requirements.

2. A common criticism of joints is that

they affect the riding quality of a pavement because of surface irregularities introduced by high or low fillers, and by variations in the concrete surface due to curling or poor construction.

3. Spalling at joints is an objectionable condition which prevails to a considerable degree at all types of joints. Honeycombed and poorly compacted concrete and improper edging of joints resulting from conventional methods of installation contribute to spalling.

4. Installing joints below the surface, pouring the slabs monolithically, and cutting down to the joint material with an abrasive wheel after the concrete has hardened—all these offer some possibility for improving both the quality of the concrete and the riding quality of pavements.

5. None of the expansion joints in this investigation prevented soil and water from the surface or the subgrade

(Concluded on next page)

TUTHILL GUARD RAILS

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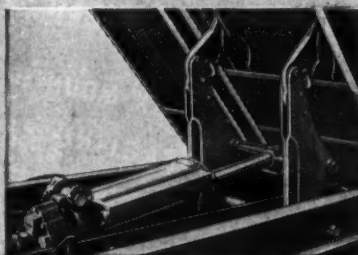
TUTHILL GUARD, with its convex surface and spring brackets, is safer, for two reasons. It can be seen quicker at longer distances. Its deflective action deflects cars back into highway and absorbs impact. Result—more lives saved—less damage to car and guard rail. Low upkeep cost.

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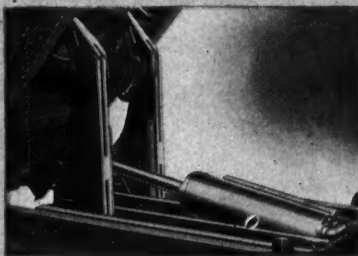
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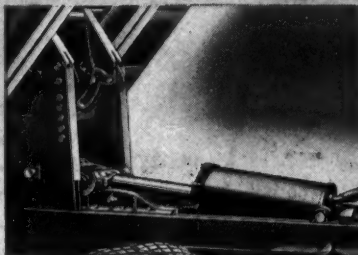
There is a right size GALION HOIST For every chassis and material handling job



GH-547A—Improved Galion double lift arm hoist with a lifting capacity of 7½ tons payload for mounting on any 1½ ton truck.



GH-577—Heavy duty Galion hoist for handling payloads of 9 tons. Particularly adaptable for long wheel base chassis also 2, 2½, 3 ton trucks.



GH-60—Extra heavy duty Galion hoist for trailer units and heavy duty trucks. Capabilities from 15 to 22 tons.

See the GALION EXHIBIT at the Road Show in Chicago

Space 1012-1213

The hoists illustrated above will be on display mounted with popular model 12 bodies

Work on schedule with GALION Allsteel HYDRAULIC DUMP TRUCKS

For a dump truck that's always on the job without annoying and costly down time, get a Galion. The equalizing double lift arm hoist which earned an enviable reputation for dependable service over the past 25 years, is now even better. Ask any Galion operator and learn why Galions outlast the chassis.

THE GALION Allsteel BODY CO., GALION, OHIO



GALION Hydraulic Hoists and Bodies on any chassis into a Better Dump Truck. The double lift equalizing hoist makes the difference.

State Tests Behavior Of Expansion Joints

(Continued from preceding page)

entering the joint space.

6. Infiltration of foreign material into cracks and joints leads to blow-ups. It appears that air-chamber expansion joints at 90-foot intervals, with intervening contraction joints in non-reinforced pavement, will close at an average rate of about 0.1 inch per year. The most rapid closure occurs at joints which provide little resistance to compression.

7. Laboratory tests, supplemented by field observations, indicate that none of the copper seals investigated offers assurance of remaining effective more than a few years.

8. The data are not sufficient to establish the serviceable life of premolded fiber and bituminous premolded joint fillers. Joints made from cypress boards appear to possess several advantages over other types and show promise of being the best type available at present. However, experience with wood joints in Illinois is extremely limited.

9. If appropriate consideration is given to the age of the pavements, there are indications that Illinois pavements built with joints at approximately 1,000-foot intervals ride better and look better than those built with closely spaced joints.

10. Examination at the end of 3 years on the Armington Experimental Road, with joints at from 15 to 50-foot intervals, showed that in every case the shorter the original panel length, the greater was the combined number of joints and natural cracks per mile. The installation of joints at short spacings to eliminate transverse cracking may be undesirable.

11. The limited data on load-transmission devices obtained from the field investigations do not justify any definite conclusions as to the relative performance of various types of devices.

12. Tests indicate that interlock provided by the irregular faces of a transverse crack is an effective means of transferring load, as long as the crack opens only a small amount; and that wire-mesh reinforcement is effective in preserving load-transmission properties afforded by interlock, as long as the mesh remains intact.

New Hinged Fastener For Conveyor Belts

A new type of conveyor-belt fastener has been developed by the Flexible Steel Lacing Co., 4656 Lexington St., Chicago 44, Ill. It consists of a series of U-shaped plates joined by a flexible hinge pin. This connector can be used with belts $\frac{3}{8}$ to $\frac{1}{2}$ inch thick. The manufacturer reports that when the connector was tested on a 30-inch-wide belt, it withstood pulls of from 18,000 to 22,000 pounds.

The galvanized plates are bolted to the belt. Their interlocking open ends are then entwined and the hinge pin twisted into place. The pin is made from tightly-wound spring steel. The flexible spring is said to bend easily with the troughing of the belt, and to be readily removable because there are no small wires to fray out.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 46.

Drag-Scraper Line

A 34-inch drag scraper has been added to the line manufactured by Alloy Steel & Metals Co., 1860 E. 55th St., Los Angeles, Calif. Model A-34 includes such features as all-welded construction, self-sharpening manganese-steel corner cutters, scientific balance to secure positive digging action and full load, and built-in runners of wear-

resistant steel.

The complete line consists of Model A in 26, 30, and 34-inch sizes; Model B in 36 and 42-inch sizes; and Model C in 48 and 60-inch sizes. Alloy Steel also makes a 42-inch scraper known as Model HA-42. It weighs 990 pounds and is specially designed to be disassembled for getting into small working spaces.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 73.

Diesel-Driven Pumps

Diesel-engine power units for use with its 6 and 8-hp pumps have been made available by Jacuzzi Bros., Inc., Richmond, Calif. These single-cylinder engines have electric starters, and can be directly connected or connected through a transmission belt, depending upon the depth of water or pressure required.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 30.

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Write for full details on this durable, efficient mixer.

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DRAGLINE • CLAM • PILEDRIVER • CRANE

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Normal conditions per hour:
Shovel or dragline — 60 yards
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Lightfooted but rugged for tough going, the SCHIELD BANTAM wastes no time getting to and from jobs. It mounts on any $1\frac{1}{2}$ ton truck chassis and speeds across town or country. Drives up and digs in. Its FULL CIRCLE design and smooth FAST CYCLE operation piles up money-making yardage . . . gives championship performance in close quarters.

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Roadside Development And Highway Progress

Better, Safer Highways Result from Integrated Design; Must be Part of "Complete Highway"

By GEORGE B. GORDON, Landscape Engineer, Public Roads Administration

During the past fifteen years, state highway departments in all regions of the country have carried out roadside-development work on highways of the Federal-Aid system. Most successful roadside work has been integrated with highway right-of-way acquisition, location, design, construction, and maintenance. For a full understanding of progress made in roadside development, it will be helpful to note some of the changes and advances in the design of highways as a whole.

Improved highway location and design are prerequisites for conserving roadside features; improving shoulders; gutters, and drainage areas; for better slope protection; safer and more convenient border development; and better design and development of wayside areas and safety turnouts. Complete highway design considers all these roadside-development objectives, and is based on good organization of the highway-department staff. The landscape engineer is only one of a number of highway engineer specialists who are directly interested in and responsible for better roadsides. Success in roadside development requires teamwork within the highway department as well as public support outside it.

By making full use of the lessons of experience, we shall be able to improve not only roadsides but also the whole highway from standpoints of safety, convenience, and appearance—and at the same time decrease some of the unit costs of construction and annual highway maintenance.

Permanence Needed

The more we study our American highways, the more we realize that permanence is the quality most needed. Many of our main highways have already been relocated two or three times, and some of them must be relocated again if they are to meet modern traffic safety and service requirements. History and experience alike tell us that pavements wear out, and must in time be repaired or replaced; that bridges become obsolete and must be rebuilt. But the roadside portion of the highway, and the adjacent land with its hills, valleys, streams, and trees, can become a permanent fixture improving with age. When we speak then of the "permanent way" or the "ideal highway", we mean a permanent location or a permanent strip of land. On this strip, pavements and structures can be repaired, widened, or replaced as the need arises, while natural features such as streams and trees are allotted the permanent open space they require.

What, then, are the phases of highway development with which the landscape engineer is most concerned? For present purposes, they may be classified under these headings:

1. Highway right-of-way acquisition.
2. Highway alignment and profile design.
3. Highway cross-section design.
4. Conservation of existing features of the route.
5. Highway drainage design.
6. Highway slope protection.
7. Highway border control and border protection.

Right-of-Way

Adequate right-of-way must always

be the essential factor in complete highway design. Roadside development naturally suffers more than other phases of highway development when right-of-way is inadequate, because it has too often been a "stepchild"—the last phase of highway development to be considered in design and construction. Observation of some of our best primary highways, including both parkways and freeways, brings out points like these:

1. The best highways have been designed to meet foreseeable future land use and traffic conditions. Their design has been based upon very careful study



Public Roads Administration Photo

This is a "complete highway"—safe, convenient, attractive, and low in annual maintenance cost because landscape and highway engineers worked together in design, location, construction, and maintenance.

of existing topography by means of surveys and contour mapping. Right-aerial surveys or equivalent ground (Continued on next page)

For Versatile
PULLING, PRESSING
or LIFTING POWER use a

Rodgers

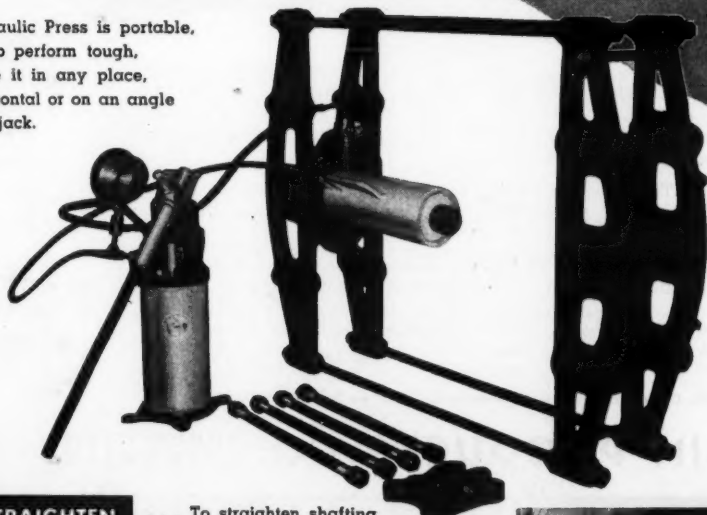


UNIVERSAL HYDRAULIC PRESS

MODELS AVAILABLE IN 50, 100, 150, 200 TONS CAPACITIES

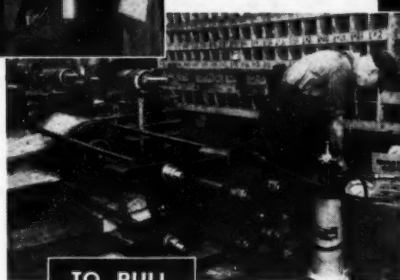
The Rodgers Universal Hydraulic Press is portable, lightweight and adjustable to perform tough, unusual jobs efficiently. Use it in any place, in any position, vertical, horizontal or on an angle to pull, press, straighten or jack. By simple high pressure hydraulics the Universal performs jobs quickly and reliably.

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16-page bulletin
giving complete
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... To straighten shafting before machining, the Rodgers Universal Hydraulic Press can be mounted on a shop stand for accessibility of operator.



TO PULL

... Here, the Rodgers Press is used to pull pitman of a rock crusher for insertion of new bearings and to assemble equipment again.



TO PRESS

... An ideal way to press planks together with Tecco Rings, making large, heavy, rigid timbers.



TO JACK

To jack pipe or concrete tile, the cylinder and pump may be removed from the press and placed in any position convenient for the operator to handle.



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MINNEAPOLIS 16, MINNESOTA



Power Pump Units



Portable Presses

Give generously to the American Overseas Aid-United Nations Appeal for Children

Roadside Development And Highway Progress

(Continued from preceding page)

of-way has been acquired after all decisions about location and design have been made and the road line laid down on a base map showing contours, land use, and other essential information. Characteristics of this type of highway are well rounded and warped slopes and drainageways, and almost complete absence of erosion.

2. Some of the worst of our newer highways have been designed to fit a strip of right-of-way land selected before design was completed. Steep slopes without adequate rounding, narrow angular ditches, inadequate shoulders, and more or less continuous erosion over the years following construction characterize this type of right-of-way and design relationship. Since there is no adequate space for it on these too-narrow highways, roadside devel-

opment tends naturally to be inadequate.

Fitting the Highway to Topography

The phrase fitting the highway "to the lay of the land" or "to existing topography" will be found in engineering literature and in some of the earliest reprints of the AASHO and HRB Joint Committee on Roadside Development. The idea has been accepted in principle by most highway design engineers. Its application in practice is something else again. This "fitting" process includes a number of parts or phases all related to each other.

In highway location outside built-up areas, existing topography tends to control both alignment and profile. As all highway designers are aware, long sight distance and easy grades and curvatures are essential in designing primary highways for modern traffic speeds. The rougher and more broken the topography, the more difficult the problem of obtaining alignment and profile with

these desirable qualities. The best possible line over a selected route might, therefore, be described as a successful compromise between the tendency of broken topography to force abrupt changes in direction, and the traffic safety requirements of long sight distance and easy curves and grades.

Many highways following the contour of rough topography have too many sharp curves to permit safe driving at modern traffic speeds. A road with long tangents following the same general route in rough topography will require extensive cuts and fills, with

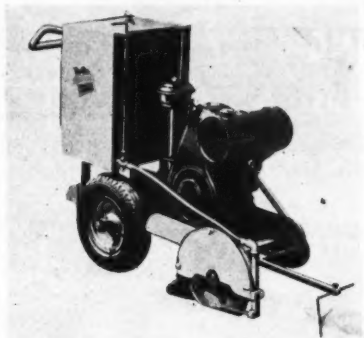
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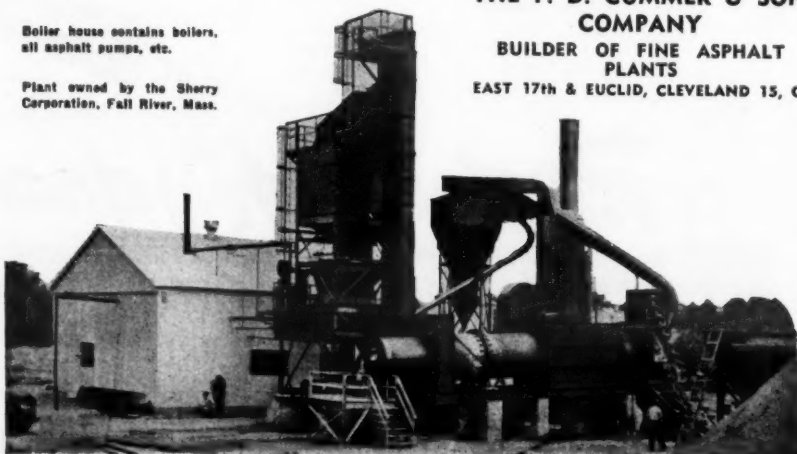
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large volumes of excavation and proportionally high costs of essential erosion control. A road with the long easy curves of a well located curvilinear type of alignment over the same route will permit the best possible compromise between the "contour" location and the long-tangent type of alignment. In practice we find two general types of alignment on primary highways, parkways, and freeways in hill topography.

1. An alignment characterized by long tangents and relatively short arcs of circular curves. In recent years (in open country) these curves have a tendency to increase in length with transitions at points of curvature and tangency.

2. A type of alignment featuring very long, easy transition curves connected by short tangents a station or two in length. This curvilinear alignment is usually laid down on contour map sheets with a spline, an instrument which tends to prevent abrupt curvature and resulting reduction of sight distances. For example, a typical 20-mile section of an eastern parkway with spline alignment shows only one "sharp" curve of about 6 degrees or 950-foot radius. Profiles consist of very long, easy grades with the longest sight distance on vertical curves possible under topographic conditions.

From the standpoint of roadside development, the curvilinear type of alignment has these advantages among others:

1. It fits the road to the topography with the least possible cut and fill, considering assumed design speeds; therefore, the cost of erosion control per mile is kept to the lowest possible figure.

2. It avoids many deep through cuts typical of long-tangent alignment in hill country. Erosion control in drainage channels and ditches is more difficult and more costly in through cuts, because surface water concentrates in such cuts sometimes over long distances.

3. It is economically practicable to flatten and round low cuts and fills more liberally than higher slopes. This more liberal flattening and rounding makes for lower erosion-control costs per unit of slope area, for better erosion-control work, and for lower annual maintenance costs on the highway as a whole.

Highway Cross-Section Design

Marked progress has been made in many states in recent years towards improving cross-section design. Secondary roads are now being provided,

in some states, with rounded slopes and gutters far superior to those of the most important primary highways fifteen years ago. Trends in cross-section progress may be briefly described as follows:

In hilly and mountainous regions several interesting types of cross-section design may be observed. A few states still construct both primary and secondary highways with typical cross

sections calling for 1 to 1 and 1½ to 1 cuts and fills regardless of topography. (Continued on next page)

sections calling for 1 to 1 and 1½ to 1 cuts and fills regardless of topography. (Continued on next page)

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Roadside Development And Highway Progress

(Continued from preceding page)

These slopes must be rounded with hand tools, and therefore usually have a slight beveling of slope crests rather than true rounding. In these states earth slides are frequently reported and erosion damage is usually accepted as a natural result of heavy rainstorms. Costs of the various erosion-control items are higher than in those states where cross-section design with easy slopes permits use of modern motor-operated grading, seeding, and tillage equipment.

In many states in hill country, 2 to 1 or flatter cut slopes are now the rule, and low fills up to about 6 to 8 feet are flattened to ratios of 4 to 1 or better, to eliminate the need for guard-rail. Guard-rails should be eliminated wherever possible because they tend in themselves to be hazards to traffic and are, as every maintenance engineer knows, a hindrance to machine mowing and snow removal.

Certain southern states with hill topography and very erodible soils have attained a leading place in fine rounding and flattening of slopes and drainage ways. In an emergency a vehicle can leave these roads at normal speeds and stop along gutter or slope areas without serious damage. The same vehicle forced off the shoulder of a road with steep fill slopes and V-type ditches is often completely wrecked. The erosion-control problem appears to be definitely solved on these southern highways.

Two contrasting types of cross-section designs have been observed, one in a western prairie state and another on a freeway not far from Washington, D. C. The first of these examples illustrates the advantages of extremely flat slopes under certain conditions of easy topography. The second shows the disadvantages of slope flattening not closely related to and controlled by existing topography.

On the first of these, in flat topography, all cuts and fills were warped and flattened with blade excavation equipment until both "fore and back slopes" had literally disappeared. Excavation for fills was obtained by shallow grading beginning at points 75 feet on each side of the center line. Since snowfall is usually accompanied by



high winds in this western region, no snow plowing is necessary on these roads in spite of usual heavy winter snowfall. Wind tends to remove snow almost as soon as it falls upon the traveled way because there are no angles or sharp depressions in the cross section

Existing landscape features can be emphasized during highway construction by a little judicious selective cutting, as these "before and after" photos show.

to bring about the formation of snow-drifts.

The second interesting cross section is on a parkway passing through low

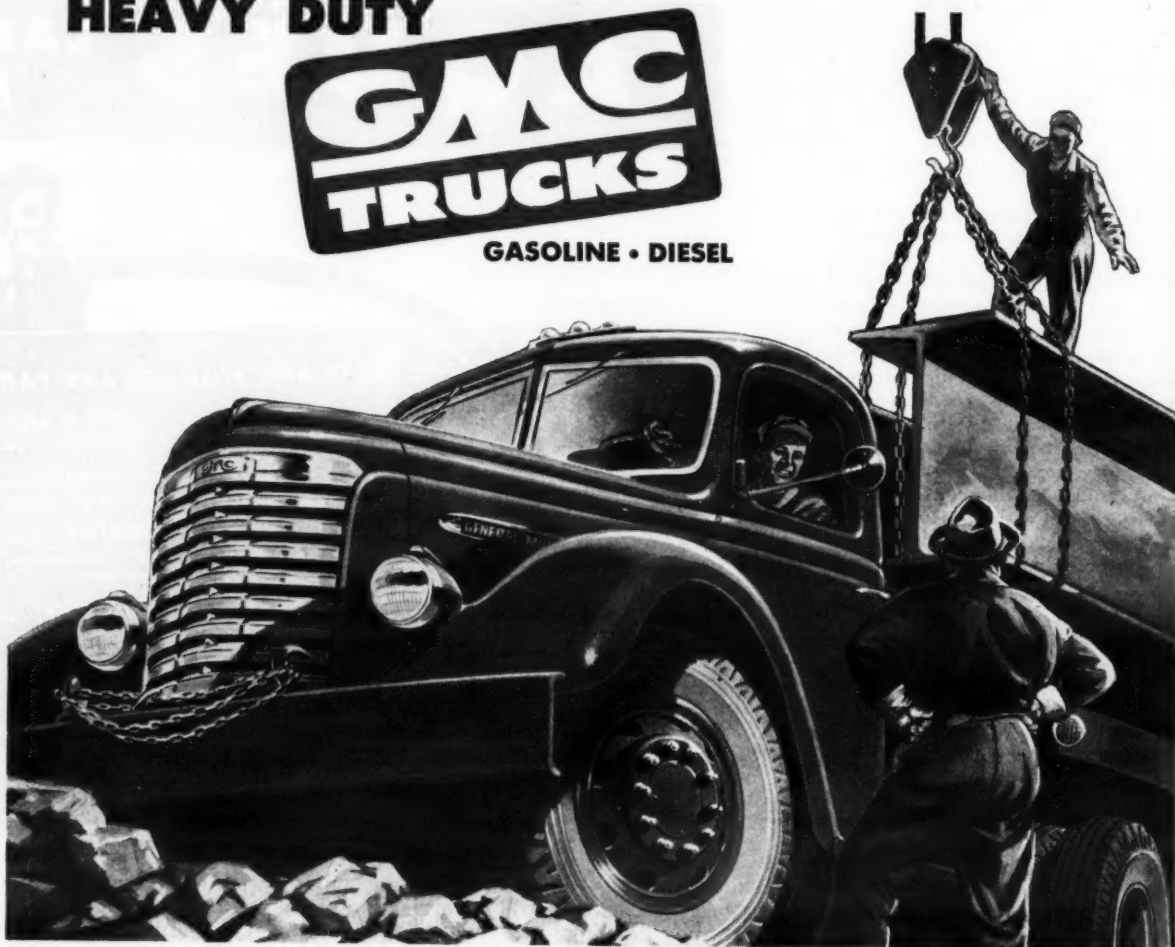
hills with natural slopes of about an average 2 to 1 ratio. Here cuts sometimes 15 to 20 feet high were flattened (Continued on next page)

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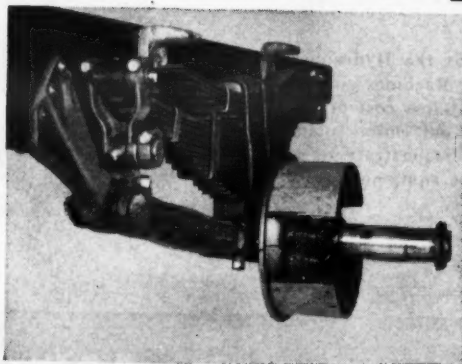
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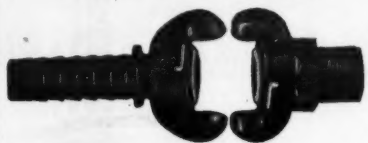
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at 4 to 1, exposing what appeared to be an unnecessarily large area of bare soil which was later seeded and mulched. Well rounded and warped 2 to 1 to 3 to 1 slopes would have "looked better" here, and fitted the lay of the land better, at lower cost for erosion control as well as for excavation. This is not to argue against flat slopes, but to emphasize the point that existing natural slopes near the road should largely control cut and fill slope ratios.

Conservation and Highway Design

Engineers during recent years have been at great pains to protect and conserve two general types of landscape features more than all others during highway location and construction. Man-made structures have a readily calculated value and are always treated with respect by the highway locator. The sentimental as well as money value of fine trees may be great and is also usually considered by highway designers. But other features have not been so fortunate because their money value is difficult to compute though it may far exceed the value of all other features combined.

More forms of recreation depend upon clean waters than upon any other natural resource. Conservation of springs, streams, and shore-line areas should receive greater emphasis in future highway design. The recreation business is a main source of livelihood for the people in many areas of many states.

Water resources can be readily conserved in the location of the road by keeping embankments at a reasonable distance from shore lines. Changes in stream channels should always be carefully considered, particularly in hill topography. Such changes have frequently resulted in flood damage to highway structures and embankments, and to private property downstream, especially when they were not preceded by careful study of stream watershed areas.

Water and other landscape features should be conserved during highway construction. It will be to the advantage of highway departments and public alike to protect shore-line areas against blasting or construction-equipment operation. It is also possible to use riprap and willow planting for future protection of shore lines and road embankments against stream erosion. Such work will help to prevent siltation and pollution of water.

Roadside Drainage Design

One of the most important elements in highway design is satisfactory drainage. To design for best drainage is to fit the alignment and profile and cross section to the lay of the land. Also watershed areas above the highway must be studied to find out not only how much water will drain to the highway now, but how much will be draining to it about five or ten years from now.

We have learned by experience that run-off reaching highway drainage structures is likely to increase in volume as woodland is cleared above the

highway or plowland is replaced by pavements. Every time a major highway is constructed near a city these changes are fairly certain to occur. This means liberal design of channels, culverts, and other highway drainage structures. It also means care in sodding, riprapping, and paving of chan-

nels on our new freeways.

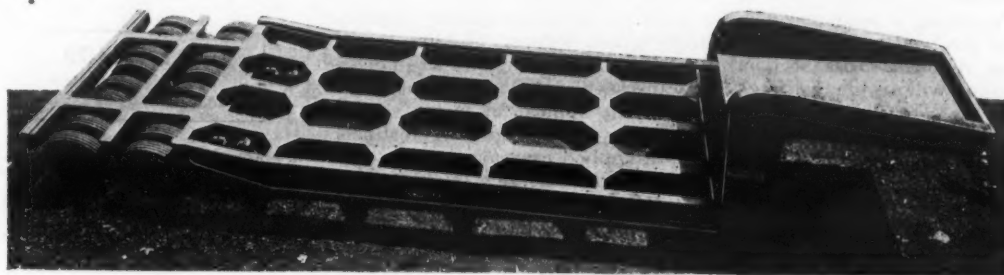
Highway departments have made much progress in the design of drainage structures and well rounded drainage channels. Have they made equal progress in locating highways, and designing profiles and cross sections so that natural drainage works for rather than

against the engineer? The author's observation on a number of new highways would indicate the answer to be a definite "no".

Highway Slopes and Design

The relation between road center-
(Continued on next page)

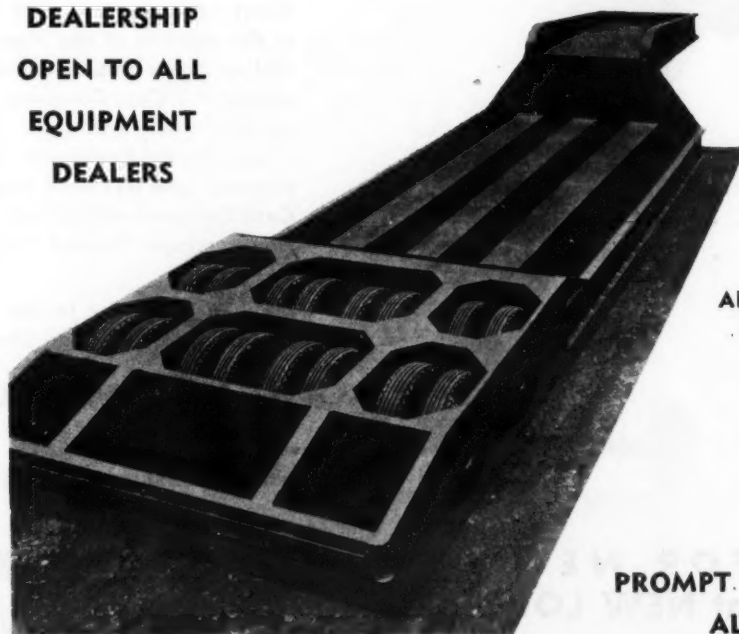
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Roadside Development And Highway Progress

(Continued from preceding page)

line location which fits the lay of the land, good warped and rounded slope grading, and slope erosion control have already been mentioned. Types of erosion control needed vary with different soils and climates. Costs of erosion control vary also with the skills of highway locators and of the landscape engineers who must take over the work when grading is completed. However, successful slope-protection work in all regions is subject to certain general principles. Assuming a location which fits the lay of the land and a liberally flattened and rounded cross section, control of erosion will, in the main, require:

1. A slightly roughened slope surface which holds mulch and seed in place until seeds germinate. Hand raking or "sand papering" of earth slopes should no longer be permitted.

2. A cover of loose hay, straw, cut brush, leaf litter, or other locally available crop waste material. Mulches have been placed, covered with an inch or so of whatever soil is available, and slopes and drainage channels then seeded. Or slopes have been seeded with 1 or 2 inches of mulch placed over the seed. The important thing to remember is that mulches should be applied at once after finished grading.

3. Seeding with grass, legume, grain, or other crop seeds which will germinate within the shortest possible time under existing seasonal conditions.

4. Addition to the slope surface of enough commercial fertilizer, high in nitrogen content, to quickly establish dense grass, legume, or vine growth. Fertilizers are usually best when disked into the seedbed. On steep slopes they have been applied in water solution with spray equipment. Or fertilizers can be applied as a top dressing after seeded plants emerge.

5. Proper mowing or other weed-control measures may also be essential

after a ground cover has been established.

Roadsides and Traffic Safety

The problems of highway border development appear to be almost unsolved as yet on some of our finest highways. The "control of access" prin-

ciple has been applied on certain parkways and freeways. But many highways to be built in the years ahead will have to be constructed and operated without benefit of the controlled-access principle.

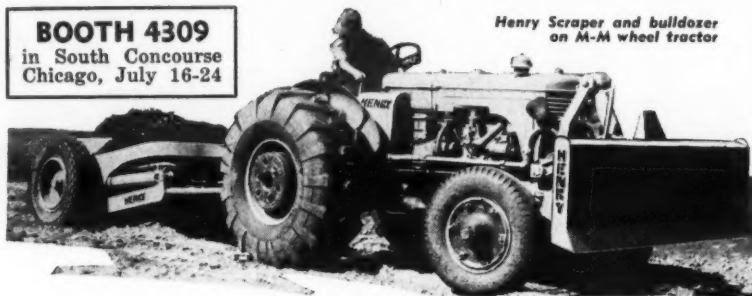
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(Continued on next page)

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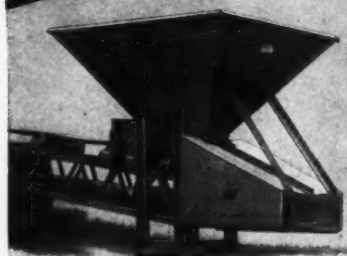
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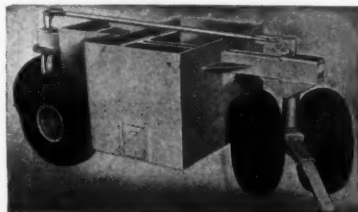
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vided highways has been recounted in engineering literature. At first, as the pattern runs, these highways carry large traffic volumes and are apparently as safe as the designer could make them. Then gas stations, billboards, private driveways, and other types of border development appear. Finally these highways lose much of their traffic capacity and become dangerous and inconvenient, as well as unsightly. So-called roadside development on narrow right-of-way without border control is then disclosed to be a losing game. This is the story told on hundreds of miles of fine highways since 1932.

There appear to be two approaches to the problem of protecting the roadside borders and the safety and convenience of the traveled way.

It is possible to obtain full border protection by right-of-way taking, highway design, and construction within the framework of controlled access as on our parkways and freeways.

On highways without controlled access, a measure of protection has been obtained by right-of-way acquisition, design, and construction with probable future border-land development in mind. Observation of existing highways carrying heavy traffic without controlled access brings out these examples of ways to provide border protection on major highways.

1. Right-of-way acquired on some highways has included a strip of land wide enough to prevent erection of any private structure—within a distance of not less than 100 feet from the outer edge of the road surface.

2. Well drained areas including exceptional shore lines, fine groves of trees, and equivalent landscape features have been selected and acquired for eventual wayside-park development for use by the traveling public. Many of these areas are those on which gas stations, roadside dance halls, and what-not first appear after a highway is completed.

3. Special care has been taken to acquire wide right-of-way at intersections to keep private development "back from the road". In this way, sight distances have not been interfered with, even though gas station or equivalent business development has followed highway construction.

4. In the design of some new highways care has been taken to: provide well designed driveway entrances to existing and proposed private land developments where they will not introduce traffic hazards; leave a screen of growing trees or brush on a liberal width of right-of-way on the outside of curves, or provide groups of planted trees to guide traffic around curves; encourage private roadside operators to leave "islands" between structures and the highway. Driveway entrances and island grading should be done as far as possible during highway construction.

Where a connected series of business or housing developments is contemplated by private operators, frontage or service roads have been provided, off but parallel to the highway, with entrance to and exit from such developments at safe points on the main highway.

5. Border control has proved effective and is sometimes preferable to



Public Roads Administration Photo

Easy fill slopes on this section of highway were readily protected against stream erosion by loose riprap with earth between the stones. Note the seeded cover on the left bank and the established natural vegetation which protects the right bank.

marginal land acquisition alone. It consists of making appropriate legal arrangement for restricting the use to

which border lands are to be put. The legal arrangements may include zoning, acquisition, or special easements, agree-

ments with adjacent property owners, etc.—all designed to preserve private rights and utilization for private business or residence without reducing the safety of the road.

Safety Turnout, Wayside Areas

At this point, a word may be said about the need for carefully located, well designed safety turnout and roadside parking space on primary highways which carry heavy traffic.

Certain highways of recent high-type design have been seriously affected in operation because they lacked strategically placed surfaced safety turnouts. These are particularly needed at points where buses stop, and at points where mail, milk, and other supplies are regularly loaded or unloaded.

Wayside parking spaces for numbers of vehicles are necessary on major highways:

1. At scenic points, or near recreational facilities such as streams or lakes, athletic fields, and the like, where the

(Concluded on next page)

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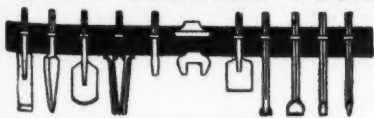
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ROCKLAND, MAINE

Roadside Development And Highway Progress

(Continued from preceding page)

public tends to stop whether such surfaced parking space is provided or not.

2. At points just outside built up urban areas where heavy trucks and trailers carrying food supplies and other materials tend to stop during early morning hours before proceeding to warehouses, docks, or railroad sidings within the city.

Looking Ahead

The problem of designing what we call a modern highway is probably less than half a century old.

During this time a number of new professions concerned with the design of structures and of land areas "for human use and enjoyment" have been growing up together. Today we find our great universities training men in the closely related fields of civil engineering, architecture, and landscape

architecture. Where trained and experienced men of the three professions have worked together in highway design, construction, and maintenance, the results speak for themselves.

This, then, is the lesson written into highway pavements, drainageways, slopes, and highway borders down through the years. The way to complete highway development lies in friendly cooperation between highway officials and the public, and between specialists in the several professional fields involved in highway design, construction, maintenance, and traffic operation.

From a paper presented before the Roadside Development Committee, Highway Research Board, at the 1947 annual meeting in Washington D. C. It will be included in the published report of that committee.

Data on Hammers, Rammers

Data sheets describing its ring-valve chipping, calking, beading, and scaling hammer and its ring-valve rammers have been prepared for distribution by the Dayton Pneumatic Tool Co., P. O.

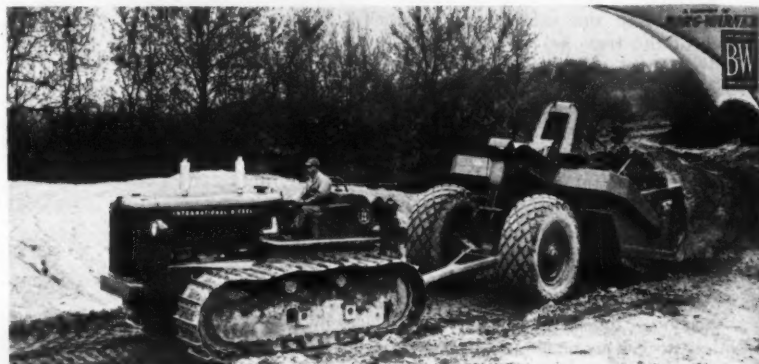
Box 747, Dayton, Ohio. Bulletin No. 200 describes the hammer, and Bulletin No. 300 covers the rammer.

These sheets feature pictures of the tools showing their construction. Specifications are given and cover the models, piston diameter, piston stroke, and the work for which each is adapted.

Bulletin No. 200 also contains figures on the length, weight, and shank size of the hammer. Bulletin No. 300 lists, for the rammer, the weight, air consumption, and overall length.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 38.

MECHANICS MAKES A SIZE and TYPE for EVERY USE



MECHANICS Roller Bearing UNIVERSAL JOINTS For Trucks • Tractors and Road Machines

MECHANICS makes Roller Bearing UNIVERSAL JOINTS for every SIZE and TYPE of tractor and road machine. From the largest to the smallest application, MECHANICS Roller Bearing UNIVERSAL JOINTS transmit maximum torque capacity with minimum weight. Joints can be removed and replaced — on the road — in 15 minutes — with a hammer and screwdriver. Let our engineers show you how MECHANICS Roller Bearing UNIVERSAL JOINTS advantages will benefit your machines.



MECHANICS UNIVERSAL JOINT DIVISION

Borg-Warner • 2030 Harrison Ave., Rockford, Ill.

... YES ...

This contractor owned a conventional Subgrader but he chose to use his Caterpillar Grader with ROADGRADER GAUGES attached because the combination is faster, more flexible and prepares a superior finegrade at a lower cost.



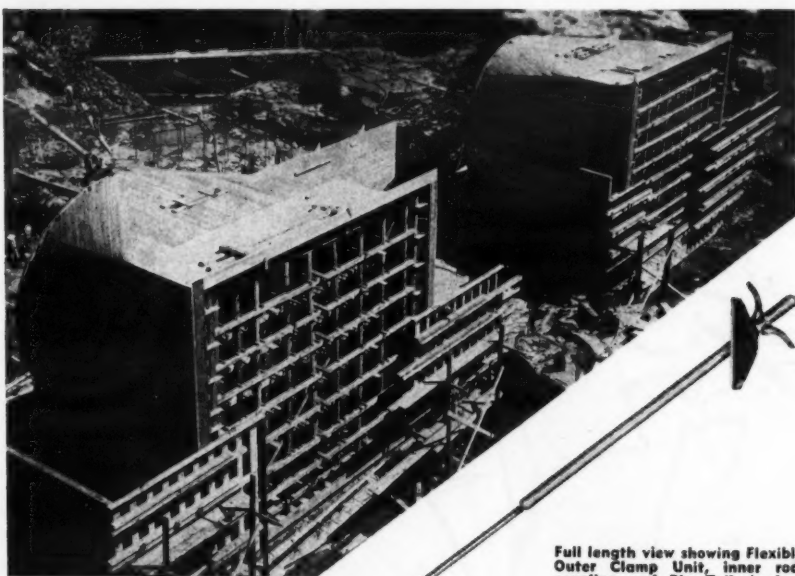
Equip your Grader with a set of ROADGRADER GAUGES and let them prove their worth to you. They will save you money on your shortest or longest paving job. For further information write to:

ROADGRADER GAUGE CORPORATION

(U. S. Patent Pending)

Equitable Trust Building

Wilmington 7, Delaware



Full length view showing Flexible Outer Clamp Unit, inner rod, coupling and Pig Tail Anchor.

BIGGER JOBS NEED SAFER, BETTER FORMS

That's why so many contractors choose Williams clamps for their toughest jobs. On big dams (like the one above), contractors use Williams equipment because they want the safety, flexibility and ease of installation for which Williams is known. Williams "Super-Hi" tensile steel pigtail anchor rods will not creep under maximum load. They are set in the concrete of the preceding pour, the threaded end protruding 3 to 6 inches. Difficult form work is simplified with Williams Clamps, angularly adjustable for all purposes.

Consider these 10 important advantages of Williams tie rods:

1. Light weight, super-strength steel.
2. She-bolt clamps may be used over and over for both spacing and tying.
3. Easily installed and removed, light to handle.
4. Will not slip, stretch or creep.
5. Leave no exposed ties nor rust streaks on finished surface.
6. Angularly adjustable for alignment.
7. Forms are held rigidly with a known factor of safety.
8. Time and material saved handling less steel.
9. The pigtail anchor rod saves steel and positively will not creep.
10. Pigtail anchors can be placed into concrete after pouring, within an hour's time, eliminating elaborate line-up and tying before pouring. This also makes it much easier to gauge centers.

Write for complete new catalog 1600 showing how Williams equipment can simplify your next job.

Williams Form Engineering Corp.

Box 925, Madison Square Station Grand Rapids 7, Michigan Phone 5-9209

Maintenance Service Rendered by Dealer

Repair Shop Is Equipped To Provide Contractors With Complete Facilities For Equipment Maintenance

AN equipment distributor's job does not end with the sale and delivery of a piece of equipment. To be of real service to a contractor, he should be ready to provide him with the parts, shop-repair facilities, and the know-how to keep his equipment going at a minimum cost and with a minimum of lost time. A complete maintenance and repair service of this type is rendered to contractors by the H. O. Penn Machinery Co., Inc. The company extends this service not only to its own customers, but to all contractors needing it.

The H. O. Penn Machinery Co. is located at 140th Street and the East River in an industrial section of The Bronx, New York City. A 3-story brick building houses the main offices, showrooms, parts department, and repair shop. In addition, three branches which have almost identical facilities are maintained in Mineola, L. I., N. Y.; Poughkeepsie, N. Y.; and Newington, Conn. The Newington plant at the present time is set up exclusively as a repair and spare-parts depot, but plans are already under way to build a modern showroom there.

The H. O. Penn Machinery Co. is distributor of a complete line of contractors' equipment and gasoline and diesel engines. It represents exclusively, in the lower-tier counties of New York State and the entire adjacent state of Connecticut, Caterpillar Tractor Co., Gardner-Denver Co., The T. L. Smith Co., and several others such as Bucyrus-Erie Co. in New York and Link-Belt Speeder Corp. in Connecticut. The firm, which is celebrating its twenty-fifth anniversary, was organized by the late Hamilton O. Penn in 1923, and moved to its present office and warehouse in 1929. Ralph L. Johnson, President, and Stuart A. Wade, Executive Vice President, are now the controlling interests in the company.

Repair Shop

The New York City repair shop is 120 x 135 feet in size and occupies the entire east section of the building. The room is well lighted, since the upper portion of the south wall consists of large clear-glass windows. Running beneath these windows is a workbench for tools and small equipment.

The fact that the room is built with regularly spaced columns prevents the installation of an overhead crane to run the length of the shop. For this reason, a novel crane system is rigged up. Cantilevered arms hang from four columns and permit the cranes to swing through a complete 360-degree circle. Each crane thus covers four work bays and is long enough to inter-

connect with the other cranes. The cantilevered arms are 20 feet long and are designed to carry a load of 5 tons, although at present they are equipped with 3-ton chain hoists. The columns from which they hang—which are also structural members—are encased in concrete for reinforcement.

An air-conditioned dust-free room has been built at the southeast corner of the shop for use in repairing and adjusting diesel-fuel injectors. Next to this room is the welding shop, equipped with a Lincoln 300-amp welder.

Machine Shop

The machine shop occupies the northeast corner of the building. It houses the various machines needed for shop repairs, as well as the storage



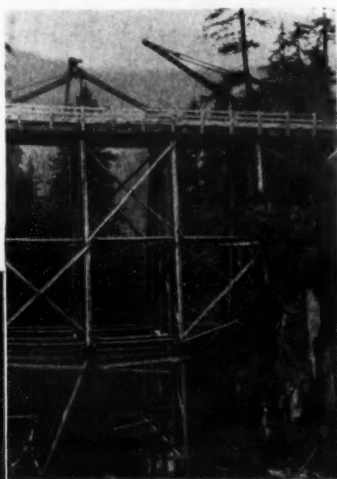
C. & E. M. Photo

H. O. Penn's 3-story brick building, located at 140th St. and the East River in an industrial section of The Bronx, New York City, houses the main offices, showrooms, parts department, and repair shop.

room for small hand tools. These tools are stored on large boards which permit an immediate visual inspection to determine if any tools are missing. At the close of the day, any blank spaces are

quickly noted and a search is made for tools that have been mislaid or left lying around.

A parts-storage loft is above the
(Continued on next page)



Bridging the gap with WAUKESHA power

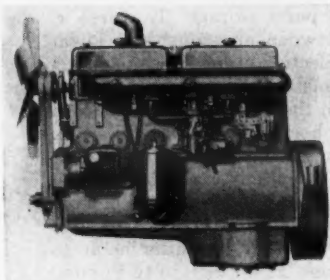
WAUKESHA ENGINES

● In the great Northwest, road building contractors cross their bridges when they come to canyons that need them—building the bridges right then and there, with Waukesha powered equipment.

Here a huge crane is setting the center truss of a high bridge for a logging road. The crane makers, Skagit Iron Works of Sedro-Woolley, Wash., well-known manufacturers of heavy-duty logging machinery, powered this 10-ton truck-bridge crane with a 140-GK Waukesha Engine.

When it comes to rough, tough jobs this engine has the build to take on all comers. All its wearing parts are precision built for quick, easy replacement. It's an engine the major parts of which can be completely renewed not just overhauled. Crankcase and cylinder frame in

MODEL 140-GK
6 cylinders, 4 1/2 in. bore x 5 3/4 in. stroke, 525 cu. in. displ. Max. hp. 142 at 2200 rpm on gasoline.



one unit. Removable wet type cylinder sleeves. Forged steel crankshaft. Seven 3 1/4 inch main bearings. Full pressure oiling. Waukesha centrifugal governor, enclosed, self-lubricated and non-hunting.

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WHEELBARROWS
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SINCE 1861

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS. • NEW YORK • TULSA • LOS ANGELES

Maintenance Service Rendered by Dealer

(Continued from preceding page)

machine room. Most of the supplies for the tool room and machine shop are stored there. Also in this loft is a supply of bronze castings for use in making bushings. Penn has found it desirable in some cases to manufacture its own bushings as needed, so that allowance can be made for shaft wear and a better fit provided than might be obtained with a standard bushing—particularly on older-model machines where precision bearings were not used.

Equipment in the machine room includes a:

- Bradford 20 x 84-inch lathe
- Bullard 36-inch vertical turret lathe
- American Hole-Wizard drill press
- Johnson electric saw
- Handy battery charger
- Cincinnati No. 3 milling machine
- Sunnen Model LB grinder
- Kwik-Way grinder
- Delta grinder

The Penn shop is equipped to handle a repair job of any size, including a complete rebuilding of construction equipment from the ground up, if needed. Often Penn will provide the means of keeping old or out-of-date equipment going. For example, one job the company has underway is the rebuilding of a Marion Model 32 steam-powered pile driver. This model is no longer available and parts are hard, if not impossible, to find. But to the pile-driving company, this is an important piece of equipment. Penn has not only been able to keep the machine in operation but, in the course of repairs, has added several improvements.

Tractor-Track Repairs

Repairs on tractor tracks are handled in a small wooden building outside, but adjoining, the shop. This building houses a Rodgers portable high-pressure hydraulic press designed to force old bushings out of the track, and at the same time to force new ones in. Nuts are removed by a hydraulic wrench attachment.

Equipment that is dirty when brought in is cleaned with a Kerrick Kleaner located near the 15-foot-wide overhead door leading into the shop. The cleaner is protected from the weather by an overhanging canopy.

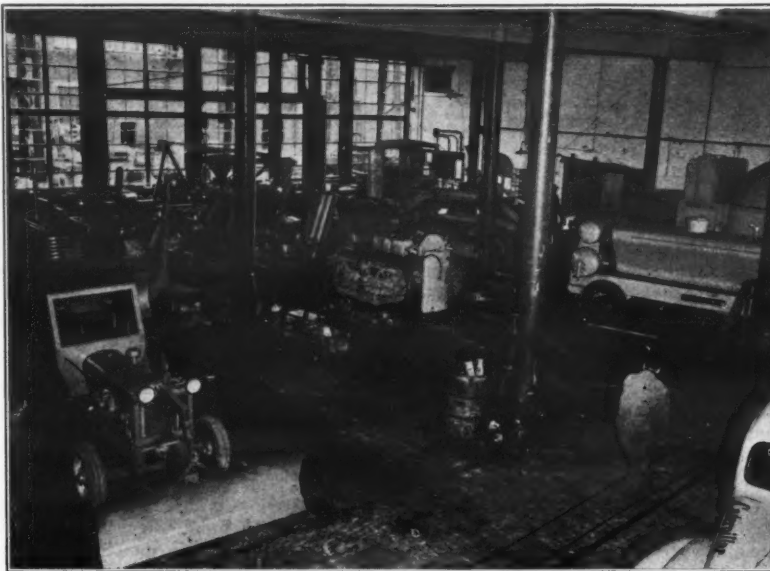
A utility jib crane for the yard is cantilevered from the main building. It has a 55-foot boom and is equipped with a Shaw-Box 3-ton electric hoist. It is used for loading and unloading; for lifting and storing tracks when being repaired; as well as for other yard-crane uses.

Size of Stock

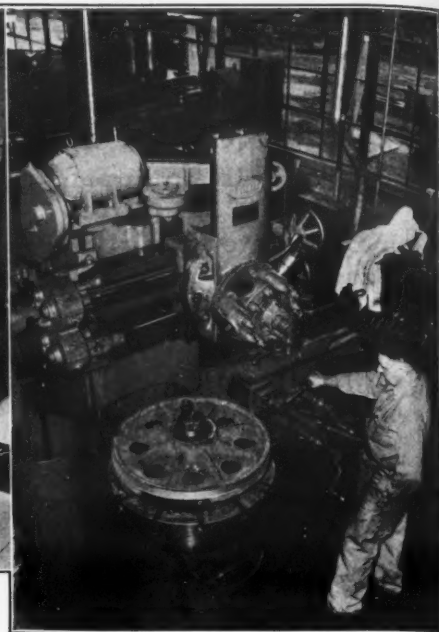
A complete stock of parts for all equipment sold by Penn Machinery Co. is always on hand. In the New York warehouse about 10,000 square feet is devoted to parts storage. The area is split up between an upper and lower floor. An electric crane hoist, running on rails, hoists and handles the parts to and from the upper floor. Some idea of the number of items stored can be gained from the number of hours used each year in taking a complete fiscal inventory. About forty men, members of the sales and parts staffs, assemble, usually on a Friday just after noon, to start the work. From then until Sunday night about 800 man-hours are used in taking the inventory. In addition to this, occasional spot checks are taken at odd times during the year to insure the efficiency of the Parts Department operations.

Gaskets of all sizes are stored in a unique way. As they are in some cases unwieldy, and as they would require a lot of drawer space, Penn decided against drawer storage. The system the

(Concluded on next page)



Above is an overall view of H. O. Penn Machinery Co.'s repair shop taken from the machine-room loft, and at right is a shot of repairs going on in the shop.



C. & E. M. Photos



They "Deliver the Goods" IN HIGH STYLE... AT LOW COST



You'll find that Chevrolet Advance-Design trucks offer *more of what you want* in your trucking operations.

They have the class of advanced styling... smart, modern appearance that speaks well for your business wherever they're seen.

And they back up the promise of their looks with advanced engineering that puts them far ahead in rugged durability, economy of performance, driver comfort.

Check over the features of these newer, finer Chevrolet Advance-Design trucks. Check over the costs of ownership. You'll find they're the only trucks that bring you Chevrolet's 3-way thrift—the *triple economy* of low operating costs, low upkeep costs and the *lowest list prices in the volume field!* See your Chevrolet dealer—and test the best!

CHEVROLET MOTOR DIVISION, General Motors Corporation,
DETROIT 2, MICHIGAN

Here Are the Features You Want... And Only Chevrolet Advance-Design Trucks for '48 Have Them All!

FLEXI-MOUNTED CAB, cushioned against road shocks, torsion and vibration—New Advance-Design-Gearshift Control and Foot-Operated Parking Brake in models with 3-speed transmissions... IMPROVED VALVE-IN-HEAD ENGINE, more durable and efficient... 4-SPEED SYNCHRO-MESH TRANSMISSION on Heavy-Duty models for quicker, quieter shifting... SPLINED AXLE HUB CONNECTION on Heavy-Duty models provides greater strength and durability... OTHER ADVANCE DESIGN FEATURES: The cab that "Breathes"*. . . Uniweld, all-steel cab construction... New, heavier springs... Hypoid Rear Axles on ¾-ton and heavier models... Hydrovac Power Brakes on Heavy-Duty Models... Ball-Bearing steering... Wide Base Wheels... Standard cab-to-axle dimensions... Multiple color options.

*Fresh air heating and ventilating system optional at extra cost.

CHOOSE CHEVROLET TRUCKS FOR
TRANSPORTATION UNLIMITED

CHEVROLET ADVANCE DESIGN TRUCKS

company adopted consists of a series of parallel sliding doors with the gaskets hung on both sides of them. In this way their size and shape is always visible, and a minimum of space is required for their storage. There are ten doors, each measuring approximately 7 x 7 feet and pitched slightly so they will roll in and out easily.

Running Inventory

A perpetual inventory is kept in the Parts Department. A Wheeldex system is employed, in which a separate card for each item is maintained on a circular roll. This is to conserve space and to provide easy accessibility at the same time. Whenever a part is received it is noted on the card, when it is sold it is subtracted; so that the cards at all times give an immediate indication of the stock on hand.

A system of cards mounted on wheels is also maintained in the Stock Department. The purpose of this card file is to indicate the bin in which each part is kept. The card denotes, in addition to the number of the part, the location of the bin in which it is stored.

Land, Sea, and Air Approaches

Equipment or parts can be delivered or picked up by land, sea, or air. The shop is serviced in the rear by a pier built on the East River, and also by a siding of the New York Central System. The siding is built low enough so that the concrete loading ramp is at the level of the bed of a railroad freight car. In this way, heavy equipment is easily pulled on or off freight cars, or can be driven on or off under its own power.

The pier was built in 1940. It serves primarily for marine-engine services and repairs, although it also accommodates deliveries and shipments. An urgent call once came in from a contractor on Shelter Island at the eastern tip of Long Island—a distance of about 95 miles. When he was informed that Penn stocked the part he wanted, he said to hold it for him, that he would pick it up right away. Much to the surprise of the Parts Manager, the contractor was there in about the time that it took to make out the order and wrap the part up. And not because the Parts Department moves slowly, either—the contractor had simply hopped into his sea plane at Shelter Island, flown to The Bronx, and landed in Penn's "back yard".

Showroom

In front of the shop, a section of the building has been remodeled for use as a display room. It is a large 60 x 120-foot well lighted room. The south wall is made primarily of glass blocks and windows, and these are supplemented by large overhead lights. Equipment is brought in and taken out through two overhead doors located on opposite sides of the room.

In the forepart of the second floor of the building are the executive offices of the company. The rest of the second floor, and sections of the top floor, are used for parts and for storage of equipment.

Personnel

The New York City shop is under the supervision of "Buddy" Shurtleff and "Hank" Killian, and employs about 45 men. Carl Dapp is in charge of Caterpillar parts, and Bill Willson handles parts for other manufacturers' products stocked by the company. The

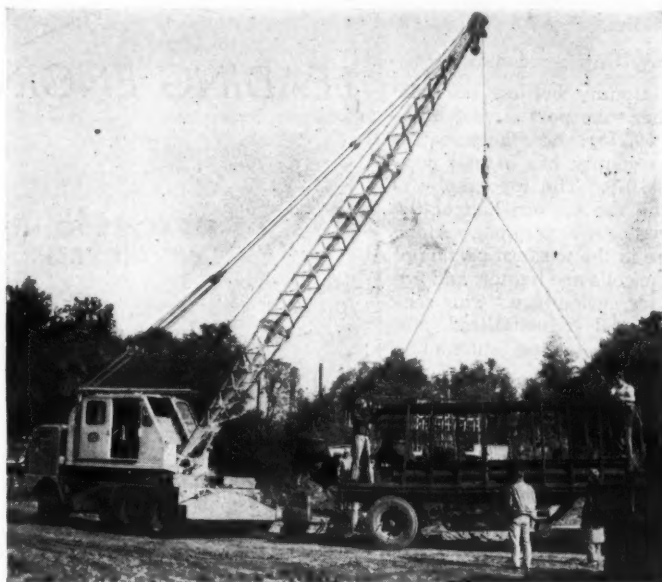
stockroom is under the supervision of Bill Speidell.

Kennametal Promotes Two

The promotion of two of its personnel to the position of Engineer and Representative has been announced by Ken-

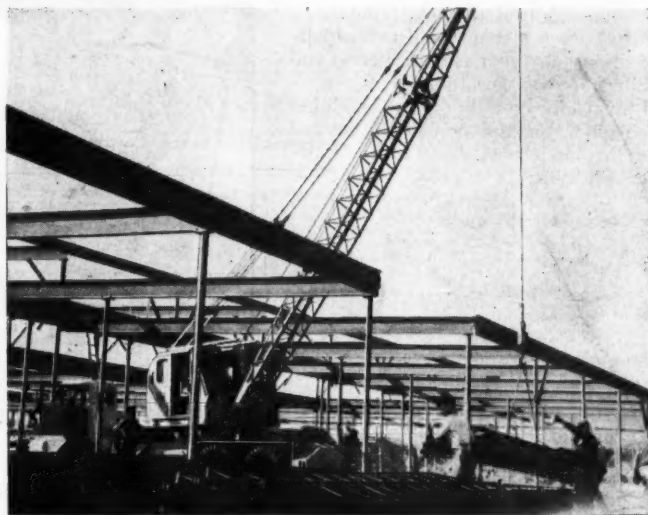
nametal, Inc., of Latrobe, Pa. This company manufactures a complete line of cemented carbide tools.

Gerald Bogner has been named to this position from the New York offices, located at 6 W. Broadway. Delmar Baker, also named, will work out of the Chicago office at 9 Jefferson St.



Four Jobs... ONE MORNING

- ① Erect roof trusses
- ② Unload cast-iron pipe
- ③ Set structural steel
- ④ Place prefab sheathing for roofing crew



F. H. McGRAW COMPANY'S MICHIGAN TRUCK CRANE Keeps Crews Busy, Prevents Delays...

This single morning's work is typical of Michigan. Although smallest of the cranes owned by F. H. McGraw Company, Inc., this Michigan 12-ton Truck Crane has worked on a wide variety of industrial construction jobs from Connecticut to

Illinois. To the complete satisfaction of its owner, it has proved an outstanding time-saver... For your jobs, too, get the mobility, speed and dependable, economical performance of Michigan Mobile Shovel-Cranes. Send for full details.



MICHIGAN POWER SHOVEL COMPANY

490 MILLER STREET • BENTON HARBOR, MICHIGAN, U. S. A.

save time between jobs with JAHN TILT TRAILERS

Tilt—load—and you're off in a matter of minutes with a Jahn Tilt Trailer. No jacks or loading ramps required. One-man operation. Positive, automatic safety lock holds platform in position when loaded or empty. Rubber mounted drawbar absorbs road shocks and protects both truck and trailer. Ideal for transporting tractors—rollers—compressors—shovel-loaders—mixers, etc. Jahn Tilt Trailers are available in 8 ton capacity tandem axle and 5 ton capacity single axle models. Write for specifications and illustrated bulletin or see your nearest Jahn distributor.

C. R. JAHN COMPANY
Dept. 1347 — 1106 W. 35th Street, Chicago 9, Illinois
Heavy duty trailers from 5 to 100 tons

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(Mail to Contractors and Engineers Monthly, 470 4th Ave., New York 16, today)

From _____
(Former address)

To _____

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Name _____

Firm _____

Position _____

County and Townships Finance Road Program

Participate in Costs on Matching-Fund Basis; Shop Repairs to Equipment Made in Modern County Garage

THE Road Commission of Muskegon County in western Michigan developed a plan last year whereby the 17 townships within the county participate in financing the construction of county roads. In former years all road construction was paid for solely out of county funds. But with the increased costs of operations as a result of larger payrolls and advanced material and equipment costs, without a corresponding increase in income, funds have not been available for extensive road improvements as in the past.

Consequently the Board of Commissioners deemed it necessary to require the individual townships to participate in the cost of road improvements within their respective townships. To make the participation program as just and as fair as possible, the Road Commission set up a schedule. According to this, one-eighth of the total amount of county road construction funds available in any one year is apportioned and credited to the accounts of the several townships equally. The remaining seven-eighths of the available funds are used to match township funds on the following basis:

	Per Cent of County Participation	Township Participation
Subdivision streets	0	100
Mail routes only	20	80
Combined mail and school bus routes	40	60
Combined mail routes, school bus routes, and milk pick-up routes	60	40
All others designated as county trunk routes and general public-use roads	80	20

Any funds unmatched by the townships of the seven-eighths apportionment, that are not earmarked for the construction season, revert to the general county road fund. They are then re-allocated to the remaining participating townships.

Regarding construction work on county roads within the limits of a city or incorporated village, the Road Commission and the city or village work out a mutual-participation agreement satisfactory to both parties. But in no case does the County participate to an extent greater than 50 per cent of the cost of the project. In this road program all work not of a routine maintenance nature is considered to be construction, and therefore to be handled on the participation basis.

Highway Revenue

Revenue for the 83 county road commissions in the state of Michigan is derived from the state tax on gasoline and the vehicle weight fee for licensing registration. Last year the State turned back to the counties \$6,250,000 of which Muskegon County received \$525,000 as its share of the revenue for road work. The County, in turn, allocated \$160,000 to the eight cities and incorporated villages within its borders, and retained the remaining \$365,000 for county road work alone. Of the total revenue collected by the State, seven-eighths of the amount allocated to the counties is returned to the individual county from which it originated. The remaining one-eighth is divided equally among the 83 counties.

In addition, the State is turning over to Muskegon County this year \$140,000, the cost of maintaining state trunk lines within the county. The County also shares in a special snow-removal fund that the State has set up to distribute among counties that have a snowfall of 60 inches or more during the winter

season. Muskegon County averages 75 inches of snow a year, and the upper portion of the county usually gets around 100 inches.

County Characteristics

Muskegon County borders on Lake Michigan where the port city of Muskegon (pop. 50,215), the county seat, is located. The county has a total population of 108,079. The topography is fairly flat, and the eastern half of the county is given over to farming. Along the lake shore in the western portion of the county the soils are lighter, and are not suitable for agriculture. This section is fairly well industrialized, and contains factories where automobile



Dual Prime Centrifugal PUMPS

Available on skids, steel wheels or pneumatic tires.

A complete line of sizes from 1½" to 10". Also 3" and 4" Diaphragm Pumps. See the nearest CMC Distributor or write for catalog.

UNMATCHED PRIMING SPEED

CONSTRUCTION MACHINERY CO'S.
WATERLOO, IOWA

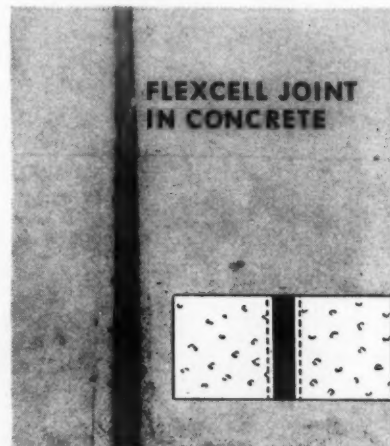
motors and parts are manufactured, and foundries for castings, also used in the automobile industry.

Gravel, an important material for building county roads, is scarce. Only one good pit is available, and that is located in the eastern part of the county. Consequently about 75 per cent of the necessary gravel for road work is

"imported" from inland counties to the east, and is shipped down the Grand River on barges to the county-seat port of Muskegon.

Bituminous materials also had to be purchased in the past from non-local sources, mostly from Grand Rapids, 40 miles to the east. Recently, however, (Continued on next page)

LEADING ENGINEERS SPECIFY



CHECK THESE POINTS OF FLEXCELL SUPERIORITY

- ✓ Will not extrude under compression by adjacent concrete slabs—millions of tiny air cells permit compression without displacement.
- ✓ Resilient and re-expands when released from compression because of its wiry spring-like cane fibres. Cellular structure permits proper uniform compression.
- ✓ Durability proved by many years of actual use.
- ✓ Retains original shape while being installed because of pre-moulded Celotex cane fibre board core. May be stored indefinitely. Light weight. Easily cut with hand saw.
- ✓ Adheres firmly to concrete. Provides neat finished joint.
- ✓ Made of Celotex cane fibre board integrally treated during manufacture, to make it toxic to fungi and termite attack. Additionally protected against moisture by FLEXCELL PROCESS which impregnates the fibres with durable asphaltic compound.

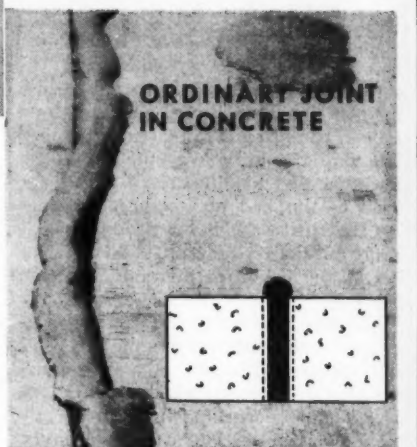
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EASY INSTALLATION

PROVED DURABILITY



AVAILABLE NOW... PROMPT SERVICE

Write for complete specifications and prices on Flexcell Bituminous Fibre Expansion Joint.

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CHICAGO 3, ILLINOIS



IT'S DIFFERENT

It's a SWING Loader

- Full hydraulic control
- Excellent visibility
- Bucket swings 90° either direction
- Mounts on International Tractor

Think of the time and money savings with a swing loader. Greater production—more tonnage!

Sold through International dealers—or write Dept. CE-7

SUPERIOR EQUIPMENT COMPANY
Bucyrus, Ohio

a new commercial asphalt plant has been set up in the city of Muskegon from which the County may purchase plant-mix material. Bitumen is obtained from sources outside the county.

The county road system includes 1,213 miles of which 300 miles are paved. They are divided as follows according to types:

Concrete	24 miles
Black-top	276 miles
Gravel	400 miles
Dirt	513 miles

Total 1,213 miles

The black-top includes plant-mix, mixed-in-place, or bituminous prime coat with a double seal. The surfaces of these roads are usually 20 feet wide flanked by 8-foot shoulders, and are built on a 66-foot right-of-way. The County also maintains 98 miles of state trunk lines. Of these, 84 miles are paved with concrete and the remaining 14 miles are of gravel construction.

Road-Commission Organization

County affairs are administered by a Board of Supervisors, 42 in number. Each of the 17 townships is represented by one supervisor, and the remaining 25 are elected to represent the cities and larger villages on a population basis. They serve a 2-year term except where a city or village has a charter designating a term of office that may run from 2 to 4 years.

The Board of Supervisors appoints the three members of the Road Commission Board who serve 6-year terms; the appointments are staggered so that a new member is appointed every 2 years. The present Commission is made up of Anton Seifert, Chairman, with Frank S. Millard and Carl Wessman, Members. Ned Fuller is Secretary of the Commission, and L. H. Neilsen is County Engineer. The Commission employs around 85 on a permanent basis, with about 10 others added from time to time as the need for extra personnel arises. It operates four garages. The main garage and shop is located in Muskegon while three smaller buildings are in Whitehall, Ravenna, and Twin Lake.

Among the heavy equipment it operates, the following units are included:

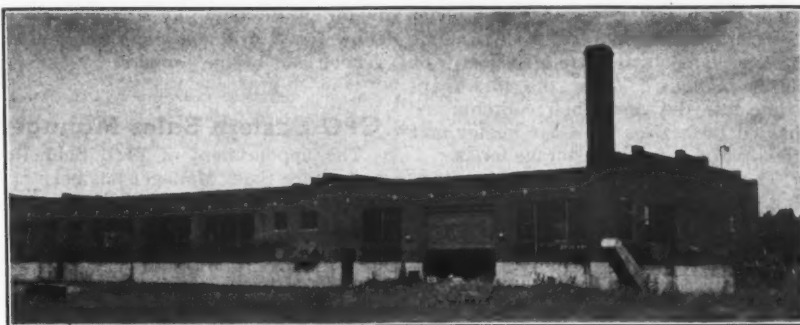
- 26 trucks, 6-ton, mostly La France and Republics
- 20 trucks, 2-ton, mostly Fords and Chevrolets
- 4 Galion motor graders
- 1 Littleford 1,000-gallon bituminous distributor
- 1 Buffalo-Springfield 5-7-ton tandem roller for patch work
- 30 Ross snow plows, V-type and one-way
- 1 Athey loader
- 1 Eagle loader
- 1 Lorain 34-yard truck crane
- 1 Michigan 34-yard truck crane
- 1 American 34-yard crawler-type crane
- 2 Caterpillar tractors—Sixty and Seventy
- 6 mowing machines—4 Case, 1 International, and 1 Fordson

Road Work

During the past year the Road Commission spent about \$75,000 on 18 miles of base course which will be surfaced during 1948 with some type of black-top. The base course consists of 6 inches of compacted gravel, 22 feet in width. The gravel is paid for on a yard-mile-haul delivered-to-the-job basis, then spread and compacted by county forces and equipment. Formerly, all of this work was done by contract, but because of increased costs the Commission is doing the spreading and rolling itself.

The base courses will benefit from traffic compaction through the winter, before they are surfaced next summer. Over the lighter, sandy subgrades the top usually consists of a prime followed by a double bituminous seal coat. On the heavier soils the pavement may be either mixed-in-place or plant-mix black-top, all 20 feet wide.

Plans are now being prepared for the construction of three new county bridges to replace some old existing structures. Contracts will be awarded for these projects during the coming season. They will be built with Federal Aid, the County supplying half the cost, or \$40,000, and the Federal government furnishing the remaining \$40,000.



C. & E. M. Photo

You are looking at the southwest corner of the Muskegon County Road Commission's modern brick and steel garage. At right are the chimney and ash remover.

During the 1946-47 winter the Road Commission had a busy time plowing snow from the highways from December clear through March. The state trunk lines received first preference in the snow-clearing operations, followed by the main county roads, and then the secondary or roads of lesser importance. The Commission's heavy trucks, equipped with plows, were used on the

plowing. And for the first time in 10 years the snow was so heavy that tractors, outfitted with hydraulic plows, were pressed into service.

For ice control the county forces used sodium chloride on all types of roads. About 500 tons were consumed last year.

Office and Shop

Road Commission headquarters are

located on a 9-acre site which fronts on Keating Street at the east end of Muskegon. At the rear of the plot of ground, a siding track enters the property from the lines of the Grand Trunk and Pennsylvania RR's. A 2-story 40 x 80-foot brick building houses the headquarters of the Road Commission which has offices on the lower floor together with other rooms for the County Engineer, Secretary, and Auditing Department. On the second floor is the engineering and drafting room. The building is surrounded by lawns and hedges, with a row of trees fronting on the street.

Across a gravel road from the office building is a modern brick and steel shop-garage with an 80-foot front and 200 feet deep. Both office and shop were built in 1929. The front or north 125-foot section of the garage is used for vehicle storage, and is entered through two large doors in the east wall. The rear 75 feet of building contains the repair shop and has vehicular doors in

(Concluded on next page)



The smoothly coordinated action of Bucyrus-Erie shovels makes digging a rhythmic dig-swing-dump routine that quickly piles up big output. Behind this precision blending of operating functions is responsive, full-feel control that practically "puts the load in the operator's hand."

Whether he is swinging, crowding, hoisting, or propelling . . . whether he is just starting the shift or finishing up . . . the operator gets exactly the power response he wants. The big cool-running clutches are self-adjusting for temperature variations, respond to lever action with a softness that eliminates jerks. The large brakes have high holding power, yet pedal pressures are low. Operating levers are long enough for plenty of feel, short enough

for easy operation; a given pressure always effects the same response. Levers are conveniently arranged, too, so that the operator finds them all within easy reach.

These are a few of the reasons why operators of Bucyrus-Erie 3/8- to 2 1/2-cu. yd. excavators can maintain a high-speed clip all through the shift, regardless of front-end type. See your Bucyrus-Erie distributor for more details about the control that gives these machines a head start in any kind of digging. And don't fail to ask about their easy convertibility for operation as shovel, dragline, crane or clamshell.

102E47

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

County and Townships Finance Road Program

(Continued from preceding page)

both side walls. Separating the two portions of the building is a fire wall which contains a door. All vehicular doors are 16 feet square and of the overhead-rolling type.

Inside, two large electric lights hang down from each of the steel trusses, while large ample windows have been built into all four sides. The floor is concrete, and a concrete step rims the entire building adjacent to the wall. Heat is supplied by a coal-burning boiler with stoker, which is located in the cellar in the rear of the building. Overhead blowers distribute the warm air.

Equipment-Repair Tools

Against the fire wall in the northeast corner of the repair shop is a 25 x 30-foot wire-mesh enclosure used as a stock room. Parts and supplies are kept in metal bins and shelves. Across the room in the northwest corner of the shop is a similar-sized enclosure with wooden walls, containing a shower and locker room for the mechanics and a small office for the garage foreman. Usually six mechanics are employed at the garage together with the foreman.

In the southeast corner of the shop, equipment is lubricated with Alemite grease guns powered by compressed air supplied by a Curtis compressor. Welding is done in the southwest corner on either an oxyacetylene set or with a Lincoln 200-amp electric welder. A 3 x 2-foot forge and a 200-pound anvil round out the equipment for structural repairs. Running overhead across the width of the south bay is a rail supporting a Budgit ½-ton and a Cleveland 2-ton hoist. Across the back or south wall is a row of wooden workbenches equipped with five vises and a valve-refacing and grinding machine.

Other equipment in the repair shop includes a Jordan battery charger capable of charging 12 batteries at the same time; a drill press; a 3 x 24-inch grindstone; a Niles 16-inch x 6-foot lathe; a Niles heavy-duty drill press; and an Atlas drill press.

Outlying Buildings

East of the garage are three smaller buildings. One of these is a 15 x 100-foot corrugated-metal lean-to that is used for dead storage. It is open in front and has a dirt floor. Motor oil and Red Crown gasoline are dispensed from a 15 x 20-foot brick building which has buried beneath it a 1,000-gallon gasoline storage tank. At the rear of the lot is a large 15,000-gallon gas storage tank. The third building is a 40 x 60-foot brick warehouse and paint shop where road signs are made and repaired. This shop is equipped with a band saw and De Vilbiss spray guns for use in the sign work. Before wooden guardrail posts are repainted, they are first cleaned with a Ruemelin sand-blasting machine powered by a Gardner-Denver 315-cfm air compressor. The entire unit is mounted on a trailer.

Next to the sign shop and adjoining the railroad siding is a loading ramp

20 feet wide x 50 feet long. Also along the railroad siding are three asphalt storage tanks with a total capacity of 30,000 gallons. When the tank cars come into the yard, their contents are heated by a Bros tank-car heater and then pumped into the storage tanks.

The ample yard is also used for storing such miscellaneous equipment and

materials as snow plows, 50,000 feet of snow fence, drainage pipe, sand, stone, gravel, and bridge timbers.

CPC Eastern Sales Manager

The appointment of Fred Schneller as Eastern Sales Manager has been announced recently by the Construction

Products Corp. of Lynwood, Calif. Mr. Schneller will make his headquarters at 5515 Bulwer Ave., St. Louis 7, Mo.

The Construction Products Corp. manufactures the Profit line of companion tools for use with J. I. Case tractors. These include shovel loaders, augers, angle dozer blades, angle graders, as well as earth scoops.

McKIERNAN-TERRY HAMMER in South America



McKiernan-Terry No. 10B3 Double-Acting Pile Hammer driving H-beam batter piles for the new pier of Corporación de Fomento de la Producción at San Vicente, Chile. Frederick Snare Corp., contractor.

In Chile, as in the States—and in Egypt, India, Denmark, England, practically the world over—McKiernan-Terry Pile Hammers are recognized and chosen by engineers and contractors for their dependable harnessed power. The pier project shown here is a recent typical example of the kind of job for which these hammers are unsurpassed.

Contractors know that they can always find in the standard McKiernan-Terry line just the hammer they need for any given job, whatever kind of piling is to be used, whatever material to be penetrated, what-

ever the location of the job. In double-acting hammers, they have a choice of ten standard sizes; in single-acting hammers five sizes; in double-acting extractors two.

SEND FOR FREE BULLETINS

Bulletin No. 55 gives complete information, specifications, etc. on McKiernan-Terry Double-Acting Hammers and Extractors. Bulletin No. 57 fully describes McKiernan-Terry Single-Acting Hammers. Both these informative bulletins should be in your files. Write today for copies.

McKIERNAN-TERRY CORPORATION
Manufacturing Engineers
13 Park Row, New York 7, N. Y.

MK-252

McKiernan-Terry PILE HAMMERS AND EXTRACTORS

CHECK...

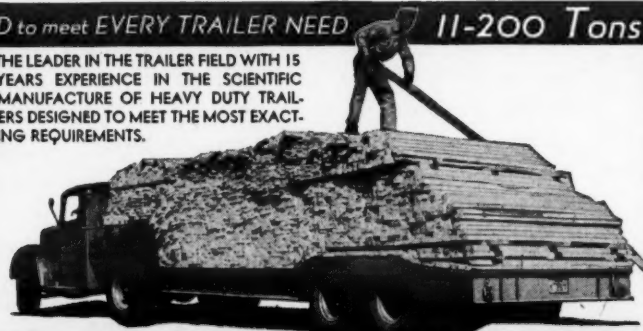
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LA CROSSE TRAILER CORP. LA CROSSE, WISCONSIN

BUY
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SECURITY BONDS
NOW!

Portable Power Saws Are Gasoline-Driven

Portable power saws in two models are made by the Durex Mfg. Co., 1268 W. North Ave., Chicago 22, Ill. They can be used for cut-off or ripping, and as straight-line or tilting-top table saws. The larger model can also be adapted to use with a 20-inch band saw or a 6-inch jointer.

The Model No. 3 saw has a 28 x 36-inch table, a 1-inch saw arbor, and a 4,200-rpm arbor speed. It uses a 12-inch-diameter blade and is driven by a 6-hp air-cooled gasoline engine. The Model No. 5 has a 37 x 48-inch table, a

1-inch saw arbor, and an arbor speed of 2,600 rpm. It uses an 18-inch-diameter blade and is driven by a 12 to 15-hp engine.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 99.

Graphited Lubricant

A lubricant made from a combination of grease and Acheson electric furnace graphite is put out by Gredag, Inc., Box 898, Niagara Falls, N. Y. It is described as a blend in which the particles of graphite are completely enveloped and supported by the grease lubricant. Ac-

cording to the manufacturer, the graphite used is 99.9 per cent pure and 200-mesh fine.

Gredag lubricants are made in a wide range of consistencies to meet several lubricating needs. There are grades for external surface lubrication, compression cup, pressure fitting and pressure-system lubrication, open bearings, ball bearings, high and low-temperature uses, open gears, and others. Gredag is supplied in 1, 5, and 10-pound cans; 25-pound pails; 100, and 400-pound drums; and wood barrels.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 70.

Bristol Plant Remodeled

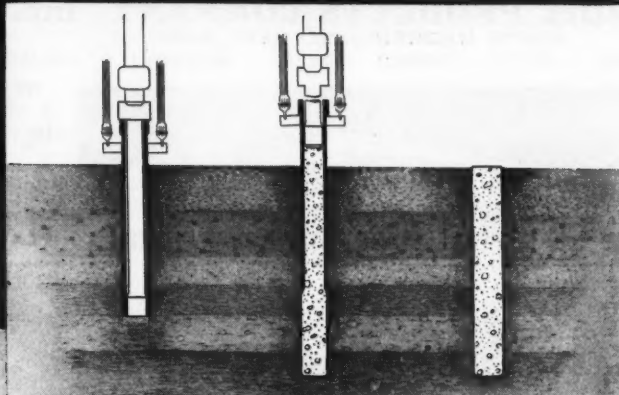
A contract for remodeling the former Fleetwings Aviation Plant at Bristol, Pa., has been awarded to the Turner Construction Co. by the Minnesota Mining & Mfg. Co. of St. Paul, Minn. The project, it is estimated, will cost about \$800,000. The building was recently acquired from the War Assets Administration. Giffels & Vallet, of Detroit, Chicago, and New York, are the architects and engineers.

The Minnesota Co. manufactures the Scotch brand of sensitive tapes, Scotch-lite reflective sheeting, coated abrasives, and roofing granules.

Foundation Security



DePaul Hospital, Norfolk, Va., rests securely on WESTERN'S Uncased Compressed Concrete Piles.*



The drive tube and close fitting core are driven to required depth. The core is removed and tube is filled with concrete. Then the core is replaced on the concrete and the pull necessary to withdraw the drive tube is taken over the hammer, thus transferring a large part of the force of withdrawal through core to the concrete. This positive mechanical method prevents separation of the concrete and ensures a shaft of constant diameter greater at all points than the outside diameter of forming tube.

WESTERN'S

Uncased COMPRESSED CONCRETE PILES*

have never failed

WESTERN'S Compressed Concrete Pile* has an exceptionally high carrying capacity. It is satisfactory under all soil conditions which permit the placing of concrete under pressure. Flowing quicksand contained by firmer strata presents no difficulties, but if soil is soupy throughout, a cased type of pile should be used.

A FEW COMPRESSED CONCRETE PILE JOBS

Langley Field, Hampton, Va.
Grain Elevator, Knights Landing, Calif.
Belvedere Corp., Lawrenceburg, Ind.
NYCRR Grade Elimination, Syracuse, N. Y.
USMC Barracks, New River, N. C.
Delmarva Power Co., Vienna, Md.
Ingersoll Steel & Disc., Kalamazoo, Mich.

YOUR JOB—Do you have a foundation problem? Contact **WESTERN'S FREE CONSULTATION SERVICE** for speedy, competent advice. Our engineers speak with the authority of our unequalled record—every job completed under every kind of site, soil, and load condition . . . with not one single failure. Write for Catalog C.

FOUNDATIONS FOR

INDUSTRIAL PLANTS, POWER PLANTS,
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BUTTON BOTTOM PILES • COMPOSITE PILES • PEDESTAL PILES • CAISSON PILES
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WESTERN FOUNDATION COMPANY
308 W. Washington St., Chicago 6, Ill.

WESTERN CONCRETE PILE CORP.
2 Park Avenue, New York 16, N. Y.



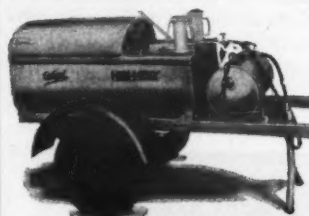
Tractor Towing Winch

A new towing winch for use with the Caterpillar Model D2 tractor is announced by the Hyster Co., 2902 Clackamus St., Portland 8, Oreg. It is direct-gear, reversible, and operates in an oil bath. Line pull has been increased to 13,400 pounds. It can be mounted on all D2 tractors, whether equipped with a fender-mounted fuel tank and

top-seat arrangement, or tank seat. It can also be used on all Caterpillar R2 tractors. A power take-off is available.

Cable capacity of the D2N towing winch is listed at 400 feet of $\frac{5}{8}$ -inch cable or 277 feet of $\frac{3}{4}$ -inch. Line speeds are said to be 93 fpm on a bare drum, and 197 fpm on the full drum.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 6.



FOR QUICKER-SAFER-CHEAPER ASPHALT MELTING

USE THE 1948

Aeroll "HEET-MASTERS"

WRITE FOR LEAFLET 400CE

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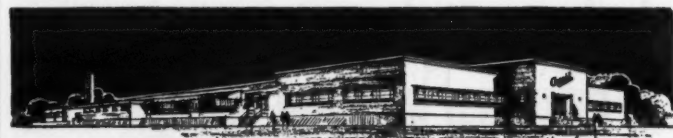
SOUTH HACKENSACK, NEW JERSEY (New address after July 1)

SAN FRANCISCO SEATTLE CHICAGO DALLAS JACKSONVILLE LOS ANGELES

NEW 2-ACRE MODERN

Aeroll

PLANT



OPENS JULY 1st. BETTER SERVICE FOR AEROIL USERS.



TURF BY Scott's

Scott's Seed produces turf which prevents erosion. Its purity and high germination will meet the most exacting specifications. Write today for prices and ask our turf specialists about your seeding problems. No obligation!

O M Scott & SONS CO.
29 Park St., Marysville, Ohio

Replacement Blades

A line of blades for use with construction equipment is made by the Beach Mfg. Co., Charlotte, Mich. These blades are designed for graders, scrapers, drags, snow plows, and other equipment which employs cutting edges. They are made with double-beveled

curved, square, or beveled ends, and in any lengths. Square or round bolt holes are punched for the equipment to which they are to be attached. Corners are provided in square, clipped, or with hooked ends if required.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 52.



Used as a hand saw, the Model 60 MallSaw will crosscut, rip or angle cut rough or dressed lumber, groove mortar joints, cut metal, cut or score tile, concrete and other aggregate compositions. When set in the sturdy portable floor stand, it serves as a table saw—complete with rip fence and miter guide; as a shaper for contour grooving, quarter round and tongue groove work; as a drum or face sander, as a wire brush or as a grinder. Also MallSaws with $2\frac{1}{4}$ ", $2\frac{3}{4}$ ", $4\frac{1}{2}$ " capacities.

Ask your Supplier or write Power Tool Division for literature.

MALL TOOL COMPANY

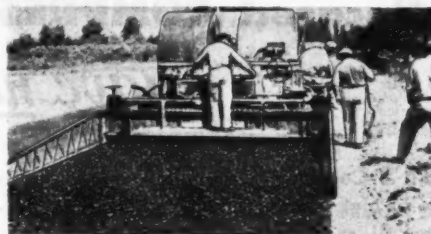
7743 South Chicago Ave.,

Chicago 19, Ill.



There's NO QUESTION about BITUCOTE EMULSIFIED ASPHALT

Application is simple and results are uniformly dependable



Under similar conditions, the behavior of Bitucote is always consistent with aggregates and equipment used.

There's nothing "tricky" about Bitucote emulsion—there is no magic in its formulation. Bitucote Emulsified Asphalt is produced only from the highest grade crudes. Experience in specialized processing plus rigid control of formulation factors insures standards of quality.

Accurately formulated, Bitucote gives unsurpassed uniform results in response to proper mixing with most, common local aggregates under normal conditions of moisture, temperature and road construction. Complete evaporation of moisture content assures permanent stability.

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Send for booklet "Pave It Better With Bitucote"

Get more of the advantages of asphalt with Bitucote Emulsion!

1411 CENTRAL INDUSTRIAL DRIVE • ST. LOUIS 10, MO.
Plants in: Cincinnati, O. • St. Louis, Mo. • El Dorado, Ark.

See for Yourself...you will find
WISCONSIN Air-Cooled ENGINES
S-P-R-E-A-D O-U-T
All Over the ROAD SHOW!



Officially, you will find the complete line of Wisconsin Air-Cooled Engines exhibited in Booth 1017, in the Main Exhibition Hall at the American Road Show, July 16 to 24 . . . and you will receive a most cordial welcome there. Pay us a visit by all means!

Unofficially, however, Wisconsin Air-Cooled Engines will be very much in evidence as standard power equipment on a great variety of road and construction equipment exhibited by other manufacturers, spread out all over the extensive Road Show grounds.

Leading manufacturers of heavy-duty machinery, calling for rugged, dependable power, appreciate the on-the-job service value of "Most H. P. Hours" . . . as delivered by Wisconsin Engines.

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN



ARBA Convention And 1948 Road Show

(Continued from page 1)

tralia, Belgium, Brazil, Chile, China, Colombia, Cuba, Egypt, Eire, Guatemala, Italy, India, Luxembourg, Mexico, Morocco, Palestine, Panama, Peru, the Philippines, Puerto Rico, South Africa, Spain, Switzerland, and Venezuela are among the foreign visitors making a special trip to view these products of American engineering genius and "know-how". Large delegations from England, France, the Netherlands, and Latin American countries are registered, with the largest single delegation from our neighbor Canada.

An international committee of 150 road builders headed by Wesley W. Polk, Chief Engineer, Illinois Division of Highways, has prepared plans for the reception and entertainment of this unprecedented number of foreign guests.

International technical sessions are giving road builders from other lands a comprehensive view of United States machinery and methods. These sessions have been arranged by Public Roads Administrator Thomas H. MacDonald, and H. S. Fairbank, Deputy Commissioner.

Topics being presented include an explanation of American highway organization and administration; highway development since 1900; methods of finance, modern design, research, construction, and maintenance; and the role of equipment in highway construction. In addition, opportunities to inspect roads, bridges and airport projects under way, and visits to factories are being provided.

Among the Exhibits

Unusual and interesting exhibits have been specially prepared for the Road Show by the Public Roads Administration. One of these gives a graphic picture of the results obtained by efficient traffic handling. Two models of a city, with the streets marked by strips of illuminated plastic, are mounted on a revolving stage. Comparisons of the traffic problems before and after they have been dealt with may be noted as the two models interchange. A second display dealing with traffic is a mechanical device illustrating how much more safely and efficiently traffic flows along an expressway than on city streets blocked by many obstacles. Steel balls represent motor vehicles as they travel down a ramp some 20 feet long. Comparative figures of the amount of traffic handled in the contrasting systems are tabulated.

Road building of the past is portrayed in a series of nineteen oil paintings by PRA artist Carl Rokeman. This is the first public showing of many of the pictures. Other educational displays include a profile map of the United States showing the amount of traffic on interstate highways, and a diorama of modern highways entering a city. The story of Federal Aid to highways since its inception in 1916 is told by a motion

picture.

In the June issue of CONTRACTORS AND ENGINEERS MONTHLY, we presented a preview of a number of the equipment exhibits at Soldier Field. Continuing this report on what you may find at the Road Show, here is a further listing of

the exhibitors and the features of their displays.

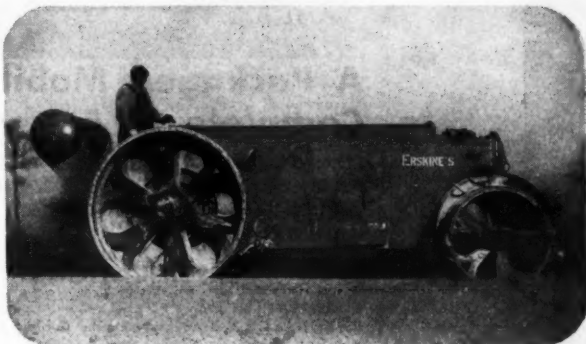
Acme Iron Works, at Booth 3850, is displaying for the first time a new Ingram 5 to 8-ton tandem roller. Its features include a shock-resistant box-

type yoke and rolls of fabricated steel plate. The 3-wheel variable-weight 5 to 6-ton Ingram roller is also on exhibit. Company representatives are in attendance to greet visitors and answer questions at the booth.

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CONTROL COSTS

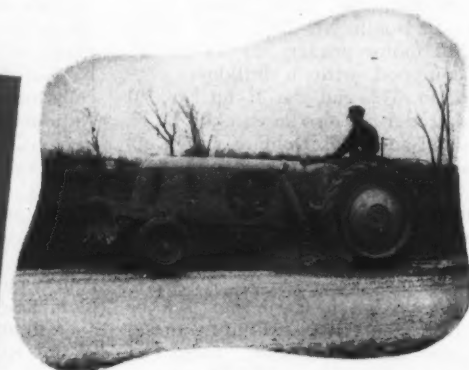
THE HUBER WAY



HUBER 3-WHEEL ROAD ROLLER—fast... economical... dependable. Built in sizes from 5 to 12 tons.



HUBER TANDEM ROLLER—variable weight... easy to operate... Built in sizes from 3 to 12 tons.



HUBER MAINTAINER for road maintenance work can't be beat. It requires only one man to operate. Blade and tools hydraulically operated.

High labor and material costs, plus shortages in both, make it imperative that road men employ the most efficient time and cost saving machinery today. To control costs the Huber way is to switch to modern, speedy, and economical Huber Road Machinery in recognition of its far-flung reputation for cutting costs to the bone.

Whether you use a Huber 3-wheel Automotive Type Road Roller with its ready adaptability to every rolling operation—a Huber light weight, versatile Maintainer that serves as a bulldozer, broom, snow-plow, patch roller or lift-loader with one operation—a Huber streamlined variable weight Tandem Roller of unusual maneuverability—they just cannot be surpassed when it comes to saving time and money. Any Huber Road Machinery user will tell you this.

Ask your local Huber distributor to give you all the facts about Huber Road Machinery. He would like to work with you.

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER

3 Wheel • Tandem ROAD ROLLERS and MAINTAINERS

MARTIN **CARRYHAUL** TRAILERS
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Your "CATERPILLAR" Dealer is your MARTIN Dealer. See him for your trailer needs.

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MARTIN CARRYHAUL TRAILERS
"Make Hauling A Pleasure!"

Ease of loading, dependability and economical operation are three Martin CARRYHAUL Trailer characteristics which make them the leaders in the field. Regardless of your hauling job, there's a proper size Martin CARRYHAUL Trailer to do it for you safely and economically.

STOP

at Booth 1238 at the Road Show

July 16-24

for a copy of the July issue of

**CONTRACTORS AND
ENGINEERS MONTHLY**

the most complete directory of manufacturers serving the highway and heavy construction field we have ever published.

ARBA Convention And 1948 Road Show

(Continued from preceding page)

J. D. Adams Mfg. Co. is showing for the first time in public its recently introduced No. 610 100-hp motor grader and its new No. B-70 rotary snow plow—at Booth NC-2205. The 76-hp No. 512 motor grader, the 76-hp No. 414 equipped with a bulldozer, the 50-hp No. 312, and the 31-hp No. 201 motor grader are also on exhibit. K. W. Chriswell and E. E. Dobbins are in attendance at the booth, along with General Sales Manager C. J. Haring and members of the Sales Department who are on alternating schedules at the exhibit.

American Bosch Corp. has Booths 1010-1211 where it is exhibiting diesel fuel-injection equipment, industrial magnetos, electric windshield wipers, special service automotive generators and regulators, and ignition coils.

American Brake Shoe Co. has as the theme of its exhibits "punished parts" which it supplies to the construction industry, both for original equipment and replacement. Products of five of the company divisions are on display in Spaces 1614, 1024, and 1225. American Manganese Steel Division is showing two Amsco manganese-steel power shovel dippers—a 2-yard and a 1¾-yard—as well as a complete line of hard-surfacing welding rods and miscellaneous manganese-steel castings. National Bearing Division is exhibiting brass and bronze bearings and precision-machined parts for tractors and earth-moving equipment. Steel upset and drop forgings used on power shovels and mobile equipment comprise the American Forge display. American Brakeblok is showing a complete line of brake lining and heavy-duty industrial brake blocks. Included in the Kellogg exhibit of paint-spray and air-compressor equipment is that division's recently announced Micro-Spray gun. Among those in attend-

ance at the exhibit and ready to answer questions are Arthur R. Sittig, Manager of Manganese Steel Sales, American Manganese Steel Division; M. B. Terry, General Sales Manager, American Brakeblok Division; R. R. Hessler, Assistant to the Vice President, National Bearing Division; Fred L.

Cogswell, District Manager, Kellogg Division; Holbrook Mulford, Vice President, American Forge Division; R. B. Parker, Assistant to the President, and J. P. Carroll, Advertising Manager of the American Brake Shoe Co.

(Continued on next page)



MADE IN ALL SIZES
7M - 10M - 15M - 20M
30M-40M-90M-125M

GORMAN-RUPP'S NEW PUMPS

WE CHALLENGE ANY PUMP TO
MATCH THEIR PERFORMANCE

With a new complete line of Contractors' Pumps, Gorman-Rupp has topped their own past high record of performance with a better pump --

- QUICKEST PRIMING
- HIGHEST PRIMING
- PUMPS MORE DIRTY WATER

Compare them for priming speed:

The new Model 15M (3") primes at 25 ft. suction lift in 61 seconds.

The new Model 90M (6") primes at 25 ft. suction lift in 44 seconds.

And the Gorman-Rupp is still the most simple pump --

No ports, no valves, no clean-out plates, nothing to cause stoppages.

Write for the new Contractor's
Bulletin 8-CP-11

THE GORMAN-RUPP Guarantee

Our distributors are authorized to put a Gorman-Rupp Contractors' Pump on any pumping job, anytime, anywhere, alongside any other make pump, size for size. The Gorman-Rupp pump is guaranteed to pump more dirty water more hours, using less gasoline and to prime quicker than any other self-priming pump. If it isn't the best all around pump, our distributor will accept the return of the Gorman-Rupp pump and pay the user any installation expense incurred.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

COUSE MOBILE REPAIR SHOP



A Packaged Mobile Shop Complete In Every Detail

FOR: TRUCKS - TRACTORS - BULLDOZERS -
ROAD MACHINERY - R. R. MACHINERY - OIL
WELLS - PIPE LINES - DAMS - MINES &
INDUSTRIAL PLANTS - AIRFIELDS & AIRCRAFT.

SPECIFICATIONS

CHASSIS—1½ to 3 ton 4 x 2 or 4 x 4 with Couse Model POU Power Take-Off and Auxiliary Engine Cooling System.

BODY—Couse Type M with lifting sides, catwalks, workbenches, tool compartments and h.c. steel workplate.

CRANE—3-ton max., 18 ft. lift.

POWER SUPPLY—12 k.w. AC for electric tools and extensive lighting. 300 amps. at 40 volts DC for arc welding. Operates either from truck engine or city power lines.

AIR COMPRESSOR—50 c.f.m. at 100 lbs.

EQUIPMENT—14½" lathe; 48" radial drill press 1½" cap.; 60-ton hyd. press; arc and gas welding; electric tools; air tools; blacksmiths tools; precision tools; hand tools.



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300 PASSAIC STREET • NEWARK, N. J.

ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS



ACCURATE...DEPENDABLE...ECONOMICAL In new road construction or in making those much needed road repairs you'll find an Etnyre "Black-Topper" accurate in distribution, dependable in performance, low-cost in operation. See your Etnyre dealer or write us today for complete details.

E. D. ETNYRE & CO., Oregon, Illinois

American Chain & Cable Co. and its American Cable and Hazard Wire Rope Divisions are located in Space 1232 in the Exhibition Hall. There wire rope, push-pull controls, and wire-rope slings are on display. In attendance are G. E. Gunther, W. E. Moore, G. A. Faerber, W. T. Kyle, Jr., W. W. Runkle, J. J. Rowley, and H. G. Harris.

American Road Equipment Co. is featuring two American road graders. One—the No. 8 or No. 8-D—is available with gasoline or diesel power, has a new frame design for greater operator comfort and working visibility, and a new type of rear axle. The American No. 6, also on display, is a new hydraulic motor grader providing in one machine a large blade, a heavy-duty scarifier, and a high-lift front-end loader. All three are hydraulically controlled and may be operated by one man. H. H. Agee, Verne Reisser, and Ted Martin will be in attendance at the exhibit in Booth 2207.

The Asphalt Institute is showing Kodachrome slides of asphalt highways, streets, airfield runways, etc., at Booth 1402. It is also demonstrating some stability tests. General Manager-Chief Engineer Bernard E. Gray is in attendance at the booth, along with the Institute's district managers and other personnel.

Athey Products Corp. is introducing three new pieces of equipment at the Road Show. They are the new PD-10 rubber-tired quarry trailer equipped with large single low-pressure tires, for use with a Caterpillar DW10 tractor; a new portable crusher unit designed for towing behind the Athey Force-Feed Loader; and new small-capacity 2-ton Forged-Trak wheels for use with portable equipment. They may be seen at Space 3208 and 3805, South Concourse.

The Barrett Division, Allied Chemical & Dye Corp., is exhibiting for the first time, at Booth 1222, its Tarvia bituminous gel—along with Tarvia road tar and Tarvalithic bituminous concrete. In attendance at the booth are George E. Martin, H. F. Klinker, F. E. Banville, W. K. O'Neill, R. T. Layman, F. Hott, L. J. Drimalla, J. J. Rosicka, T. A. Cozzens, and A. S. Turner.

Be-Ge Mfg. Co. is showing, for the first time, Models SS-760 and ST-760 of its Speedhauls, a new series of hydraulically operated self-loading scrapers. The Model SS Speedhaul is designed for use with rubber-tired tractors, and the ST with track-type tractors. Company representatives include Albert Gurries, President; Eric Hyde, Sales Manager; Raymond Gurries, Eastern Representative; I. L. Taggart, Midwest Representative; and James Hope, Southern Representative. The exhibit is located in Space 3004 and 3825.

Blaw-Knox Co. has a live display of mechanized road-building units on 100 feet of paving set-up at Booth 3104. These include a precision subgrader, vibratory spreader, and vibratory finisher operating as a team, plus Blaw-Knox steel paving forms. Another set-up shows the Blaw-Knox widening finisher operating without load. Two new batchers, shown for the first time, are operating with material—a new cement weighing batcher and a new automatic aggregate weighing batcher. The twin cement and aggregate weighing batchers are also on display, along with two units of the recently introduced Hi-Boy truck-mixers. The company's rectangular concrete bucket, clamshell buckets, and roller-gate buckets are represented, plus forms for curbs, curbs and gutters, sidewalks, and articulated flexible face forms. A Blaw-Knox insulated steel building of the pre-fabricated type houses the office and



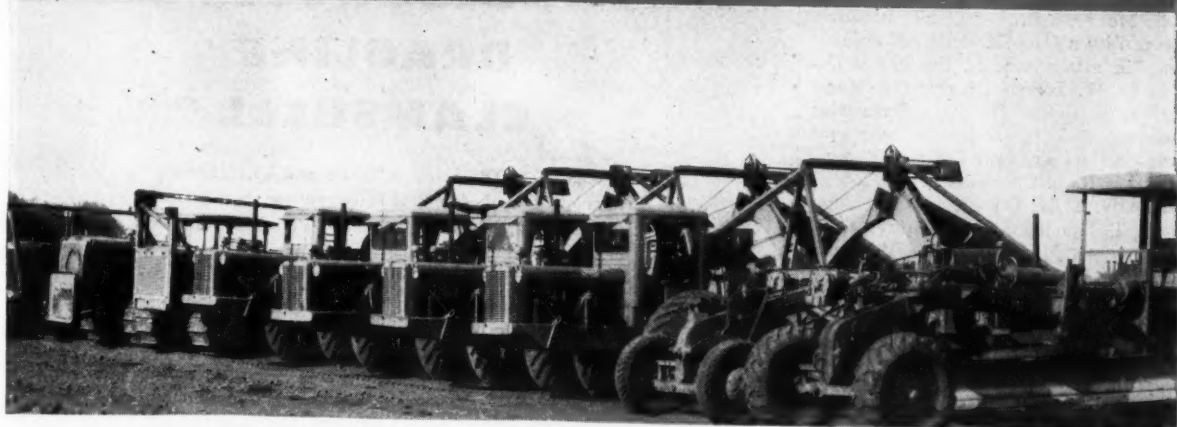
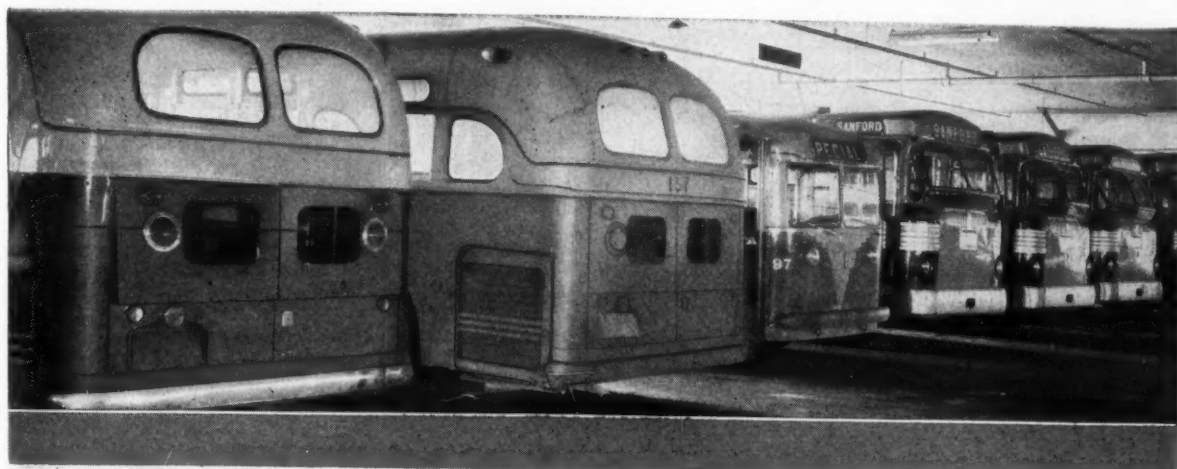
Before it was driven from Lorain, Ohio, to the Road Show, this 20-ton MC 414 Motor Crane received the blessings of these attractive Thew Shovel Co. employees.

reception room of the exhibit. The company also has three booths for movies showing the use of its construction equipment.

Brooks Equipment & Mfg. Co. is exhibiting its Load Lugger—a hoisting mechanism for installation on standard trucks. Displayed with it are the Brooks detachable truck dump bodies. Harry H. Houston is in charge at Booth SC-3822.

Wm. Bros Boiler & Mfg. Co., located in Space 3009, is showing for the first time its giant pneumatic-tire roller. Other Bros equipment on display includes a truck-mounted rotary snow plow; a circulator; steamer; a giant sheepfoot roller; and a standard-size pneumatic-tire roller. F. G. Johnson, A. O. Williamson, C. W. Bros, R. J. Hasbrouck, O. G. Hollimon, Howard Hempy, and Noel Armstrong are on hand at the booth.

The Philip Carey Mfg. Co. has Booth 1021 where it is featuring Elastite highway products. These include Careylastic hot-poured joint-sealing compound, expansion joints, subgrade felt, and bridge planks. Uses for these products (Continued on next page)



Solve heavy-duty lubrication problems with

Are your fleet engines exposed to heat, heavy loads, and continuous operation? If so, compare your heavy-duty service with that of the two fleets, shown here... discover whether the solution to their lubrication problems can help you improve the economy of your fleet operations.

Bus Fleet: Peoples Transport Corporation of Muskegon, Michigan, represents a typical, heavy-duty city bus operation. Its 79 buses cover approximately 200,000 miles each month. Conventional oils did not stand up under this hard service. A shift to Stanolube HD Motor Oil stopped sludge troubles, reduced oil consumption. Three years of clean operation have brought reduced engine overhaul costs for this fleet.

Truck Fleet: Heavy-duty service means exposure to heat and heavy loads for the Paul C. Miller fleet of gasoline and Diesel-powered road-construction equipment at Grand Rapids, Michigan. A regular motor oil did not prevent sludge troubles and bearing failures. When switched to Stanolube HD, engines stayed cleaner and on the job longer. Repair costs went down

Stanolube HD Motor Oil

15%. Rings were free at all times, and consumption of oil and fuel was reduced to a minimum. Furthermore, one oil—Stanolube HD—brought these low maintenance benefits to both gasoline and Diesel engines.

A Standard Oil Automotive Engineer will help start you off with the right grade of Stanolube HD for your particular heavy-duty fleet operation. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA)



ARBA Convention And 1948 Road Show

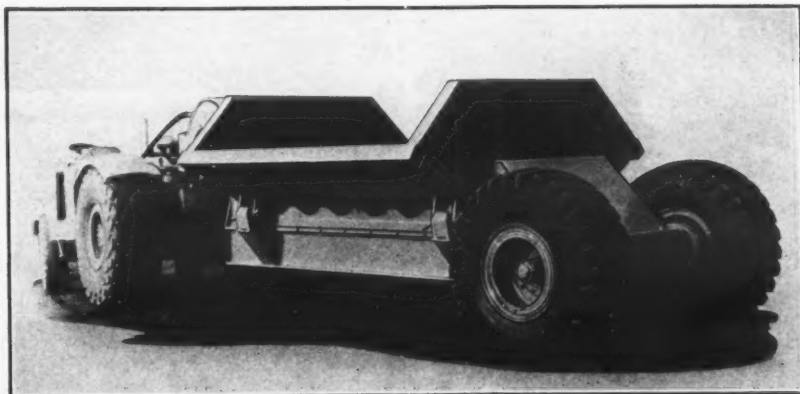
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are shown on a miniature highway which makes up part of the exhibit. Representatives in attendance include V. V. Malcolm, Manager of Industrial Sales; F. W. Anderson, Chicago District Manager; and H. B. Johnson, Assistant Manager, Chicago District.

Carver Pump Co. is showing models from its complete line of self-priming and industrial pumps, at Booth 3823. It is featuring its newly developed diaphragm pump. R. J. Carver and R. S. Williamson are in attendance.

J. I. Case Co. is located in Booth 3004. Among the units on display there are various models of Case engines; engines with generators; a Model VAI tractor with Tokheim cab and No. 16 Case-Detroit highway mower; a VAI with an Anderson snow plow; another VAI with a Detroit Harvester sweeper, and one with a Frank G. Hough sweeper; VAI tractors on which are mounted a Lull Mfg. Co. Challenger Model 5-M 1/4-yard loader, an Owen Model VA-I 1/4-yard loader, a Profit loader with scoop and scarifier, a Profit Superlift loader and rear angle dozer, a Profit angle dozer and earth auger, and a Wausau reversible-blade snow plow; a Model SI tractor with Hough 1/2-yard loader; another SI with a Lull Universal Tilt-Tower loader; a Model DI tractor with American tractor winch; a DI with an Anderson snow plow; DI tractors with a La Plant-Choate Carrimor scraper, a Lull Model 4-B Shovel loader, a Model DI-I Owen loader, and a White loader; a Model LAI tractor with Be-Ge 5-yard Speed-haul scraper and one with a Henry Mfg. Co. Model G-3 scraper; and a Profit Mover, a bulk-material handler, powered by a Case Model VAE engine. Those in attendance at the booth include G. W. Iverson, Industrial Manager; J. P. Cody, Assistant Industrial Manager; Ralph Nelson, Industrial Service Manager; and District Representatives R. L. Chevalier, F. I. Coyne, Dan Daily, C. W. Draeger, L. L. Hoaglin, H. T. Lynch, J. A. Murphy, J. E. O'Connor, R. F. Shalek, J. A. Vetchell, and R. A. Warnecke.

Caterpillar Tractor Co. is exhibiting



This new Athey PD-10 rubber-tired quarry trailer is being introduced to the construction industry at the Road Show.

a full line of its equipment in Space 3208-3805, South Concourse. The array of Caterpillar diesel track-type tractors includes the new D8, which features a constant-mesh transmission and 130 drawbar hp; and D2, D4, D6, and D7 units equipped with earth-

moving accessories. The latter include Caterpillar cable and hydraulically controlled straight-blade and angling-type bulldozers, scrapers, rippers, a cable control unit, and a Caterpillar implement hitch. A DW10 diesel wheel-type tractor and W10 wagon, and a combina-

tion of the DW10 and Caterpillar No. 10 scraper, as well as a full line of Caterpillar diesel engines and electric plants are also being shown.

Supplementing the Caterpillar line is allied equipment designed for use with Caterpillar equipment, such as Hyster Hystaways, Traxcavators, earth borers, tree dozers, root-cutter plows, an Athey MobilLoader, Athey quarry and trailer wagons, Fleco root rakes and stump dozers, and Martin trailers.

Company representatives and Caterpillar distributors are at the booth to help present to visitors the story of Caterpillar products and their role in road construction.

Commercial Shearing & Stamping Co. is showing in Booth 1830 its line of oil hydraulic pumps, valves, and cylinders; stampings; and forgings. On display for the first time are 1/2-inch tandem-type sectional control valves for oil hydraulics. Those in attendance at the booth include E. A. Berglund, J. H.

(Continued on next page)



**America's Largest Builder
of Material Handling Buckets**

SHOVEL PULL SHOVEL DRAGLINE CLAMSHELL

FRONTS, BOTTOMS, SCOOPS and TEETH shown in color on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.

Experience Counts. See your shovel man or equipment dealer about PMCO Buckets and Dippers.

All Purpose



DRAGLINE

Perforated Sizes 3/4 yd. to 2 yds. 20%-40% lighter than other makes.
Solid Sizes 3/4 yd. to 2 yds.
Mine Stripping Sizes 2 yds. to 9 yds.



PULL SHOVEL
Outside Cutter Widths:
21", 26", 31", 36", 39"



CLAMSHELL
Sizes 3/4, 1, 1 1/2, 2, 3, 4, 5 yds.

SHOVEL
Sizes 3/4 yd. to 18 yds.

On the 1/2 yd. and 3/4 yd. Shovel, Pull Shovel, and Dragline Buckets, all teeth are interchangeable—a great advantage to operators.



"Quality Since 1880"

PETTIBONE MULLIKEN CORP. CHICAGO 51, U. S. A.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES

HODGMAN Protection

INSURES
CONSTRUCTION



• No. 3062 Waders — Sturdy, comfortable waders for construction workers and all who work in wet, muddy places. Made of strong jersey type fabric coated with a natural rubber compound. Seams, crotch and in-seam fully reinforced. Sturdy black rubber boots with cleated sole and molded heel. Suspender straps equipped with buckles.

★

WRITE FOR COMPLETE
CATALOG OF PROTECTIVE
CLOTHING.

Hodgman Rubber Co.
FRAMINGHAM, MASS.

Drennen, L. J. Gray, A. A. Miller, Jr., J. A. Hagan, J. A. Dalton, and D. H. Winter.

D-A Lubricant Co., manufacturer of a complete line of lubricants and engine oils used in all types of heavy-duty equipment, is occupying Booth 1035. In charge is Robert J. Binford; in addition, a number of D-A representatives from the eastern, southern, and central areas are on hand to greet visitors and answer questions.

The Daybrook Hydraulic Corp. has put on display at Booth 3027 13 pieces of equipment, including its standard hoist and body models, special hoist and body models, Boulder Dam rock bodies, coal bodies and conveyors, semi-trailer hoist and dump body, and the new Speedlift hydraulic power tail gate. It is showing for the first time its new Hi-N-Lo body for air-entrained concrete. J. F. McKiernan, J. C. Moser, F. W. Stevenson, Lou Wood, and H. O. Day are showing visitors around the booth.

Duplex Truck Co. is exhibiting its Model L 8 to 10-ton truck equipped with a Hercules RXLD engine, Fuller transmission, Timken axles, Ross steering gear, and a cab manufactured by Trailmobile. The truck has a Daybrook body with 5-yard sides, 7-yard ends, and 1/4 cab shield. It is designed for heavy-construction work, snow plowing, and general highway maintenance. Duplex is also showing an engine generator set, using a J. I. Case engine and Century generator, designed so that 110, 220, or 440 volts single or three-phase can be taken off the machine. The Duplex booth is No. 4108.

Erie Steel Construction Co. has a Strayer portable concrete plant in operation at Booth 3217 in the South Concourse. From ramps, visitors can inspect each step in its action. A new feature of the unit permits the elevation of each batch to an adjustable concrete chute that swings freely and is easily raised or lowered to meet job demands. Erie is also showing its barge and Hard-Digger clamshell buckets, and the AggreMeter unit used in its aggregate plants.

The Euclid Road Machinery Co. exhibit is located on the South Concourse, Booths 3002-3201. Some 24 units are shown, including rear-dump, side-dump, and bottom-dump hauling units, as well as the Euclid loader. Many of the models incorporate new developments shown for the first time. A large staff of engineering, sales, and service personnel is on hand to give visitors information on the new models and features.

Al Evans Winches, Inc., is showing, for the first time, its line of winches, snatch blocks, cable, and cable fittings in Booth 1007A. The Evans line includes general-utility winches, tractor-mounted models for tree and stump pulling, heavy-duty double-sheave sling blocks, both light and heavy high-speed automatic quick-acting snatch blocks, root and wrecking hooks, a variety of steel cable fittings, and improved-plow-steel cable for pulling and choker lines, drum lines, slings, anchor lines, and similar uses. A. W. "Al" Evans and J. E. Upham are in attendance at the booth.

Ford Motor Co. is showing nine vehicles fitted with the latest developments in road-building and contracting equipment. The exhibit includes a 1949-model station wagon and new-model trucks of 4,700 to 21,500 pounds gross vehicle weight rating. The vehicles are powered by V-8 and 6-cylinder engines. The new Series F-7 and F-8 extra-heavy-duty trucks, added to the Ford line this year, are featured prominently. Special road-building and con-

tracting equipment installed on the trucks includes a 4-wheel-drive conversion, hydraulic scrapers and snow plows, side and rear dump bodies, underbody hoists, five-speed direct and overdrive transmissions, special contractor-type bodies, a 1,250-gallon oil distributor with a circulating spray bar powered by a Ford V-8 engine, and power-driven pressure equipment for lubricating road-building machinery. Power shovels, tandem drive and trailing third-axle units, and transit concrete-mixing apparatus is also being shown. The Ford exhibit is in Space 3006. Company officials at the booth include J. D. Ball, Director, and D. W. Lee, Assistant Director, Truck and Fleet Sales Dept.; W. E. Kimbrough, Manager, Truck Sales Section; C. L. Miller, District Truck and Fleet Manager, Chicago.

The Four Wheel Drive Auto Co. is showing its HA, HG, and M7 trucks, along with its new ZU 33,000-ton model

(Continued on next page)



Dallett's Contractor Tools

ASPHALT CUTTERS

MOIL POINTS

GADS

DIGGING CHISELS

DALLETT'S Line of Contractor Tools are made under rigid standards and from the material best suited for their intended applications. Dallett's quality tools will always give top performance.

Write for Bulletin C-220

TOOL MAKERS

PNEUMATIC EQUIPMENT

DALLETT

ACCESSORIES

SINCE 1883

THE DALLETT COMPANY

MASCHER AT LIPPINCOTT STREET, PHILADELPHIA 33, PA.
Manufacturers of Pneumatic Tools and Accessories

DISTRIBUTORS in principal cities throughout the United States, Canada, Europe and South America.



Mr. Edward H. Frazee, president of Intercity Quarries, is sold on the New Holland Model 3030 Double Impeller Breaker and the quality product delivered by Dual Impact Action. He says, "Bottlenecks in crushing were over for us the day we installed our New Holland 3030 Breaker... we have given up the idea of trying to feed this machine to capacity. The City Engineers of Kansas City have declared this stone superior to other stone crushed here and have awarded us contracts on this basis. You can

identify this stone immediately. No slivers, flat discs or odd shapes, nothing but cubical in the six sizes of commercial stone we make.

"We highly recommend this New Holland crusher to those who want high capacities at low operation and maintenance costs."

Learn more about the advantages of Dual Impact Action and its profit-building possibilities. Write for the illustrated catalog which shows why New Holland Double Impeller Breakers produce more... with less power!

NEW HOLLAND MANUFACTURING COMPANY

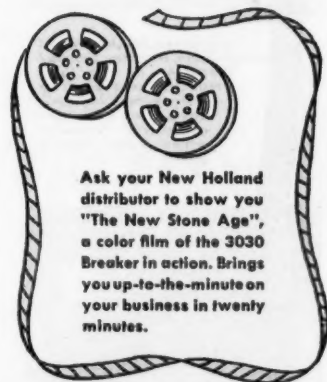
DIVISION

NEW HOLLAND MACHINE COMPANY

DEPT. P-4, MOUNTVILLE, PENNSYLVANIA

NEW HOLLAND Breakers
DOUBLE IMPELLER

NH



Ask your New Holland distributor to show you "The New Stone Age", a color film of the 3030 Breaker in action. Brings you up-to-the-minute on your business in twenty minutes.

ARBA Convention And 1948 Road Show

(Continued from preceding page)

just recently announced. Visitors will find the following company personnel at Booth 2620: Robert Meek of Sales Promotion, Field Sales Manager Leo Polzin, Director of Sales R. L. Koehler, Vice President in Charge of Sales R. H. Schmidt, and Advertising and Sales Promotion Manager M. O. Stockland.

Gilson Bros. Co. is exhibiting in Booth 3838 its concrete mixers and rock pulverizers. Being shown for the first time are a new 3½-S concrete mixer, a new plaster mixer, and a new No. 14 pulverizer for gravel crushing. John P. Gilson, M. V. Gilson, and Jerome Gilson are on hand to greet visitors.

W. E. Grace Mfg. Co. is exhibiting a spreader, sweeper, roller, and a Rapid Fire heater for asphalt tank cars—at Booth 3860. The spreader is a new item

which the company makes for applying sand, stone chips, or rock to highways. It comes in 8, 10, and 11-foot widths, and features positive gate control.

Gruendler Crusher & Pulverizer Co. is featuring one-eighth scale plastic models of its various crushers at Booths 1006-1207.

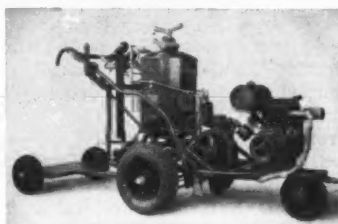
Hercules Motors Corp. is showing 31 engines and power units at Booths 1014-1215 in Exhibition Hall. These include the DIX-6, a 6-cylinder diesel, and the DIX-4, a 4-cylinder diesel, which feature interchangeability with gasoline engines of similar power capacity; the three "pancake"-type 6-cylinder diesels DFXHF, DJXHF, and DWXLDF; and the DNX-V8 engine. It is also displaying the two new heavy-duty gasoline engines it has added to its line—the 6-cylinder TDXB and RXLDH.

Hydro-Crane Division, Bucyrus-Erie Co., will display its first larger-size

Hydrocrane at Booth 3866—the H3 Model, rated at 3 tons or ¾-yard capacity. This truck-mounted all-hydraulic crane-excavator has hydraulically operated tandem outriggers which support the weight of the crane when working.

It has a hydraulic telescopic boom and new improved metering valves for precision control, and its design eliminates gears, shafts, drums, clutches, brake chains, and sprockets.

(Continued on next page)



All-Purpose Striper Solves Zone-Marking Problem

Self-propelled and completely self-contained, designed to meet the needs of state and county highway departments, municipalities and airports for accurate high speed striping.

Clean-cut, attractive lines are assured with K-C Air Curtains. Air actuated traction up to 5 MPH with a trailer for the operator. Truck mounted and other models available for all requirements. Write for folder.

KELLY-CRESWELL CO., Xenia, Ohio



JACKSON SIDE FORM VIBRATOR

The **only equipment of this character designed solely and specifically to meet paving construction requirements!**

ELIMINATES MANUAL LABOR

This machine, which may be mounted on any modern finisher or spreader, employs two vibratory units that are simultaneously lowered into or raised from the concrete through the hand lever on the deck of the finisher or spreader by the regular operator. No other labor is required.

RUGGED . . . TROUBLE-FREE

Vibrators are electric vibratory motors in which the vibratory medium is an integral part of the motor. Vibration is transmitted to a simple loop of steel tubing bolted to the lower end of the motor. Thus all flexible shafts or long rigid shafts, which can be a major source of trouble, have been eliminated. Motors are exceptionally rugged, having been proved in more than 25 years of severe service. Power is supplied by reliable Jackson Power Plant on the finisher.

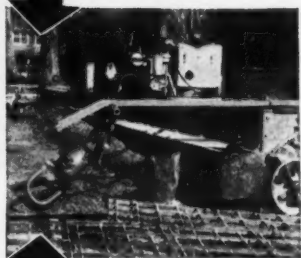
INSURES A BETTER JOB

Vibrators operate well ahead of front screed of any finisher. Loops are well rounded to allow operation close to form or reinforcement without fouling and will ride over any obstruction encountered. Thorough compaction of concrete is assured regardless of rate of finisher or spreader progress. In reverse travel vibrators may be left in concrete without damage to concrete or equipment. No spots will be missed where this machine is used. Nothing approaching the efficiency of this machine has ever before been offered. Write for the complete facts, NOW!

See it at Chicago Road Show

Manufactured by
ELECTRIC TAMPER & EQUIPMENT CO.
for

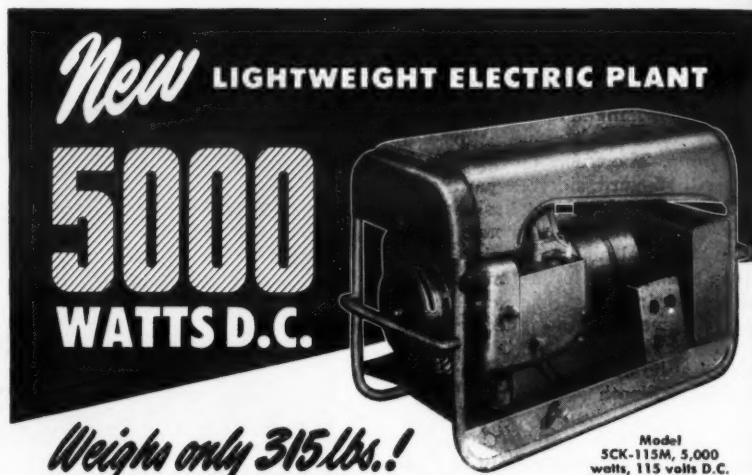
JACKSON VIBRATORS, INC., Ludington, Mich.



Vibrators in the raised position. Note the rounded character of the loop which enables it to get up close to the side forms. Loops may be inexpensively replaced when wear finally occurs.



In this view in which the vibratory element is nearly wholly submerged, note its proximity to the form and the plasticity of the otherwise stiff concrete immediately surrounding it.



New LIGHTWEIGHT ELECTRIC PLANT

**5000
WATTS D.C.**

Weights only 315 lbs.!

Model
5CK-115M, 5,000
watts, 115 volts D.C.

Use fast-working electrical tools on any construction or maintenance job with this high capacity, portable, compact electric plant. Equipped with four-receptacle box for direct plug-in of tools or lights. Available with carrying frame, or dolly-mounted. Powered by Onan 10 HP, two-cylinder, 4-cycle, air-cooled engine. Shipped complete . . . ready to go!

NEW ONAN "CK" ELECTRIC PLANTS are available in 5000 watts D.C., 115 and 230 volts; 2000 and 3000 watts A.C. in all standard voltages. COMPLETE ELECTRIC PLANT LINE INCLUDES: A.C.—350 to 35,000 watts in all standard voltages and frequencies. D.C.—600 to 15,000 watts, 115 and 230 volts. Battery Chargers—500 to 6,000 watts, 6, 12, 24, 32 and 115 volts.

ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 HP. BH: 2-cylinder opposed, 5½ HP. 1B: 1-cylinder, 3¼ HP.

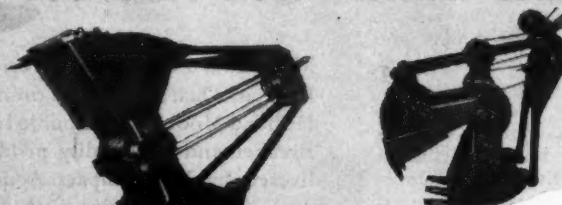


Write for catalog

D. W. ONAN & SONS INC.
4854 Royalston Ave., Minneapolis 5, Minn.

ONAN ELECTRIC PLANTS

You Can't Beat Welded Construction



WELLMAN Williams Type BUCKETS

Wellman pioneered welded rolled steel construction for longer life and greater service. It's the extra strength that gives the extra, low-cost digging power. Whatever your requirements . . . whether for Multiple Rope, Power Arm, Dragline, Power Wheel or Special Service—specify Wellman! ¾ to 16½ yd. capacity.

SEND FOR BULLETIN

THE WELLMAN ENGINEERING CO.
7012 CENTRAL AVENUE • CLEVELAND 4, OHIO

Independent Pneumatic Tool Co. is giving the new Thor wagon drill and the Thor 75-pound paving breaker their first public showing at Booth 3602. A Thor backfill tamper, sinker rock drills, clay diggers, trench diggers, nail drivers, hitch cutters, cement guns, electric hammers, pneumatic and electric saws, and other associated tools and accessories round out the display.

Iowa Mfg. Co. has Space 3012-3205 at the Road Show. Among the items on exhibit there is the recently announced Cedarapids Patchmaster low-cost portable continuous-mix bituminous plant. A feature of the display is a Cedarapids Unitized plant consisting of four units—a portable primary crusher, a scalping unit, a secondary crushing unit, and a wet or dry screening unit. Each is mounted on a pneumatic-tired truck for portability.

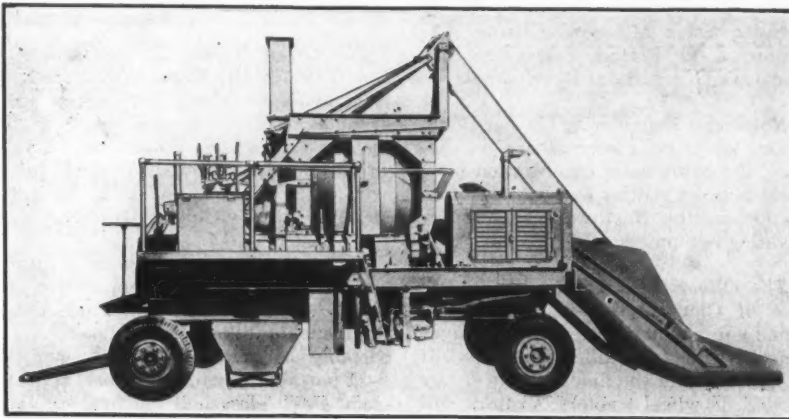
Isaacson Iron Works, Inc., has set up models of its equipment for International tractors adjacent to the International Harvester exhibit, at Booths 3207-A and 3218. The display includes over 25 Isaacson products for every model of International tractor, including the TD-24. Isaacson's Mobile Service & Sales School rounds out the exhibit. It has just returned from coast-to-coast trips in the U. S. and Canada, and it contains cutaway models of all the mechanical parts of the Isaacson hydraulic systems and Winchoists.

Jaeger Machine Co., in Space 3602 and 3801, is featuring its complete line of portable air compressors in 75, 125, 185, 250, 365, and 600-cfm capacities, the new Type X diagonal-screed concrete finisher, the new Model BP-5 bituminous paver, new re-mixing compacting concrete spreaders, and side-discharge truck pavers. The air compressors will be demonstrated, as will the latest models of hydraulically controlled hoists, dewatering and pressure pumps, building mixers, and truck-mixers.

Jeffrey Mfg. Co. is showing in Booth No. 1406 a complete line of steel thimble roller drive chains and sprockets, conveyor-belt idlers, and a Type B-3 20 x 12-inch hammermill for crushing stone. Those in attendance include J. A. Jeffrey, Vice President; L. E. Brill, Manager of Sales, Products Division; L. A. Rhodes, Manager of Sales, Crusher Division; L. E. Newell, Superintendent of Research and Testing; Howard S. Davies, Chicago District Manager; R. W. Stevenson, R. E. Briggs, and F. W. Nicholson, Sales Engineers; W. L. Bradshaw, Milwaukee District Manager; H. J. Flint, Manager of Sales, Traylor Division; C. O. McFadden, Columbus District Manager; and A. W. Lemmon, Manager, Development Department, Chain and Material Handling Division.

Koppers Co., Inc., at Booth 1015, has a specially built display showing some of its products and their applications. Among them are Tarmac road material, coatings for concrete abutments and culverts, waterproofing and damproofing materials, and pressure-treated highway posts and bridge materials. Information on the company's new pre-fabricated highway trestle bridges is available. In charge of the exhibit are A. R. Nickel and M. F. Cravey of the Wood Preserving Division's Chicago office; A. R. Taylor of the Tar Products Division, Pittsburgh; and W. O. Boyd of the Chicago office of the Tar Products Division.

La Plant-Choate Mfg. Co., Inc., has the largest exhibit in its history, displaying its equipment in Spaces 3205A-3216 and 3207A-3218, South Concourse. Included in the display are five tractor-drawn scrapers, three of these being



One of the new pieces of equipment being exhibited at the Road Show is this Pettibone-Mulliken portable asphalt batch plant.

8, and 14-yard truck capacities for use with track-type tractors, and the other two hydraulically controlled models for either high-speed rubber-tired tractors or track-type tractors. The 2-yard size will be shown with an Oliver Model 88 and the 4-yard with a Case Model

LAI tractor. In addition, La Plant-Choate is showing four models of its new self-propelled line: a TD-300 four-wheel-drive 4-wheel-steer Motor Dozer; the TW-300 15-yard bottom-dump Motor Wagon; the new TS-200 9-yard Motor Scraper; and a 14-yard

TS-300 Motor Scraper. All of the equipment is being operated in the display area. In addition there are movies of the units in action. Also on display is an operating exhibit of the complete line of La Plant-Choate fluid power units consisting of the basic units and various hydraulic pumps, hydraulic motors, valves, and jacks.

R. G. LeTourneau, Inc., invites conventioners to Booth 3022-3033 to operate the dashboard buttons of the new electric-control Tournapull, several sizes of which are being shown. Models of the rubber-tired Tournadozer are also on display, as well as an electric-control mobile Tournacran. Exhibit Manager Vernon E. Pray, T. O. McMahon, and LeTourneau sales and service personnel are in attendance at the booth.

Link-Belt Speeder Corp. is showing colored motion pictures of its shovel, crane, and dragline units at Booth 1601. (Continued on next page)



NOW on EASY CREDIT TERMS

DISSTON HEAVY-DUTY TWO-MAN CHAIN SAW

with Mercury Gasoline Engine



TWO NEW FEATURES ADDED

AUTOMATIC CHAIN LUBRICATION

Improved engine-end chain lubrication provides positive pressure with constant flow of oil in any felling or bucking position. Prevents clogging. Automatically shuts off the instant clutch is disengaged. Has no exposed oil lines.

"CRADLE BALANCED" TAIL STOCK

Stronger, narrower, more compact. Tough aluminum construction. Fulcrum at front end provides better leverage and easier maneuvering in cut. Completely encased for safety. Simplified tension meets individual requirements.

PLUS THESE OTHER EXCLUSIVE FEATURES

- All controls within easy reach of operator.
- Detachable air filter keeps dust from carburetor.
- Die cast engine cylinders.
- Positive-acting, non-slipping, multiple disc clutch.
- Cutting chain is specially heat-treated Disston Steel.
- Guide rail of hardened and tempered Disston Steel, reversible end for end and top for bottom.
- Built-in Magnapull starter; no ropes to wind or lose.
- Sizes, 24" to 84."



AVAILABLE NOW

Get in touch with your Disston Chain Saw Dealer

HENRY DISSTON & SONS, INC.
774 Tacony, Philadelphia 35, Pa., U. S. A.

NEW FINANCING PLAN

The Disston Time Payment Plan, serviced by Walter E. Heller & Co., installment experts, provides a sound, generous, easy-to-pay method of financing the purchase of a Disston Heavy-Duty Two-Man Chain Saw. Take advantage of this plan. Get your unit now and let it go to work for you.

20% Down Payment
(For 36" Model At Present Prices)
\$131.00 DOWN

APPROX. \$48.00 PER MONTH
12 MONTHS TO PAY

ARBA Convention And 1948 Road Show

(Continued from preceding page)

The pictures have been gathered from large and small jobs in every territory, and the units shown range in capacity from $\frac{3}{8}$ to 3 yards. D. W. Lehti, G. H. Olson, Hayes Parsons, and R. B. Barnes are in attendance at the booth.

McKiernan-Terry Corp. is offering, at the Road Show, copies of its new four-page folder listing in concise form the specifications of McKiernan-Terry pile hammers and extractors. Ten sizes of double-acting hammers, five single-acting hammers, and two double-acting extractors are now included in the line. This literature is available at Booths 1007 and 1238.

Master Vibrator Co. is exhibiting its generator plants, vibrators, electric hammers, tampers, grinders, screeds, and Twin-A-Trowels at Booth 1214. The Twin-A-Trowel and the tamper are being shown for the first time. Sales Manager W. H. F. Stenken is in charge at the booth.

M-R-S Mfg. Co. is featuring its new 125-hp all-purpose diesel-powered wheel tractor, the M-R-S Model 125, in its exhibit space 2609-2410. Other equipment shown includes a 4-wheel scraper and an M-R-S bulldozer with the new Model 125 tractor, as well as Models 85 and 110 Mississippi Wagons. Exhibit Managers are H. E. Brown, Sales Manager, and C. M. Chumley, Jr., Secretary-Treasurer. Others in attendance include L. R. Simmons, President; C. H. King, Vice President; E. S. Tierney, Service Manager; W. L. Wiley, Chief Engineer; John A. Donahoe, Advertising Manager and C. R. Morris, Sales Representative.

National Safety Council, Construction Section, is on hand to tell visitors about the services it renders and the help in job-safety problems which it makes available to members. A feature of the exhibit is the Section's film on the safe operation of construction equipment. Robert L. Moore, Staff Representative, is in charge at Booth 1812.

The Herman Nelson Corp. is introducing two new portable heaters at the Road Show. Both are fuel-oil-burning and both have electric-motor drive. One is a low-priced model in the utility class, designed for the light-construction and building field. The other is a de luxe fully automatic unit streamlined in appearance. The company is also showing standard models of its portable heaters and ventilators. The exhibit is at Booth 3846 where the following company personnel are in attendance: R. C. Koehring, Division Manager; J. D. Hodges, Service Manager; and K. A. McIntyre, Western District Manager.

Nordberg Mfg. Co., occupying Booth 1838, is featuring, through an automatic slide projector, pictures of Nordberg equipment. These pictures show Symons cone crushers ranging in size from 22 inches to 7 feet; Nordberg jaw and gyratory crushers; grinding mills; Symons horizontal vibrating screens, a vibrating bar grizzly, and 2 and 4-cycle stationary diesel engines in sizes from 175 to 8,750 hp. Of special interest to Road Show visitors is the "packaged unit" consisting of a Symons cone crusher with motor, mounted on skids for portable or semi-portable operations. Marvin Thistlewaite and John Crandall, Sales Engineers, are in charge of the booth. Others in attendance include A. E. Owen, Canadian Branch Manager; T. D. Davis, Manager of the Nordberg San Francisco Office; G. E. Jarpe, Manager, Spokane Office; K. S. Block, Manager, New York office;

J. B. Bond, Sales Engineer; R. R. Schultz, Sales Manager, Crusher Division; C. O. Friend, Sales Research, and J. D. Grace, Sales Development.

Northwest Engineering Co. has Booth 1013. While no machines are on display, the entire sales organization is on hand to greet visitors and impart information on the Northwest line of excavating equipment.

The Oliver Corp. is showing its full line of Cletrac crawler tractors and allied equipment, along with the Oliver wheel tractors and allied equipment. It is exhibiting for the first time the Oliver 77 and 88 wheel tractors. Visitors will find the display at Space 3604-3803, where W. E. Miles, Manager, Industrial Division, along with other company

personnel, is in attendance.

The Owen Bucket Co. has space at Booth 3834 in the South Concourse and is showing its clamshell buckets and grapples. Representatives at the booth include Edward W. Botten, Secretary-Treasurer; Jack Botten; Wm. H. Russell; W. S. Jenkins, and L. L. Hanson, Manager of the Chicago Branch.

Pettibone-Mulliken Corp. has a number of new pieces of equipment at Booth 2618-A. These include the Pettibone-Mulliken Speedloader, a portable asphalt batch plant, and a P-M portable gasoline hammer, as well as a P-M clamshell bucket, dipper, pullshovel dipper, and dragline bucket.

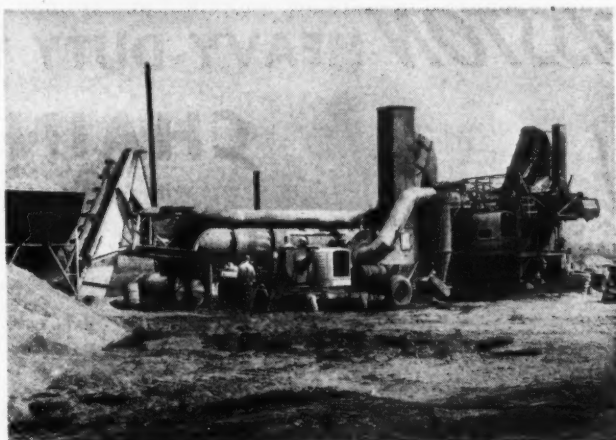
Ransome Machinery Co. See Worth-

ington Pump & Machinery Corp.

Rodgers Hydraulic, Inc., has Space 3818 in the South Concourse, where it is exhibiting hydraulic track-pin press equipment, portable and stationary universal hydraulic presses, stationary hand-powered and motor-driven shop presses, and hydraulic jacking units in capacities from 50 to 200 tons. G. A. Rodgers, L. W. Brown, and T. E. Rugg are in charge of the display.

Rogers Bros. Corp. is displaying its trailers at Booth 3864 in the South Concourse. Visitors are invited to inspect the Tagalong trailer which permits dump trucks to serve as tractors and which can be loaded, unloaded, and towed by the dump-truck operator

(Continued on next page)



Wherever there are GM Diesels,

there's a GM Diesel

WELL over a quarter-million General Motors Series 71 Diesel engines have gone into service—into wartime jobs, into peacetime jobs. They've gone into all kinds of applications—road building, construction, pumping, sawing, stone crushing, drilling and in everything else that can use dependable, efficient, economical Diesel Power.

No matter where they are, all these engines share one thing in common. That is, they have a thorough, capable interest of the nearby General Motors Diesel Distributor.

*Diesel Brawn
Without the Bulk*



alone. The Type T Rocking Beam trailer is being shown as well as a rear assembly of the Type D with 16 rear wheels and an 8-wheel rear assembly of the Type H drop-deck trailer. Harrison Rogers, Vice President and General Manager, will be at the show, along with Wayne Fobes, Edward Swaney, Virginia Hambry, Jean O'Brien, Jay Davis, Fred Keesler, and Clyde Keesler.

Schild Bantam Co. is featuring its 1/2-yard truck-mounted unit which converts from power shovel to dragline, trench hoe, clamshell, pile driver, or crane. The display is at Booth 3026.

Schramm, Inc., is showing its complete line of air compressors and pneumatic tools. It is featuring its new Model 60 crawler-type compressor.

President Henry N. Schramm, Vice President Harold J. Schramm, Secretary Leslie B. Schramm, Sales Promotion Manager A. O. Witt, Manager of Dealer Sales F. H. Wharton, Manager Chicago Office, G. E. Norden, and others will be at Booths 3201-A and 3212.

Shaw Sales & Service Co., in Space 3017, South Concourse, has on display its Sealcoat and Wheeler 3 to 5-ton tandem rollers, and the larger 5 to 8-ton tandem rollers. Those in attendance include Beal Shaw, President; William B. Shaw, Secretary; J. Earl Conlin, General Sales Manager; J. R. Hedding, Service Manager; C. W. Hess, H. J. Reynolds, H. I. Hickman, and others.

Simplicity Engineering Co. is featuring a 4 x 10-foot triple-deck gyrating

screen in operation. Company representatives in attendance at Booth 3856 include R. C. Johnson, R. T. Gilbert, William Furman, Leo Lovett, E. Kay, "Stan" Holzman, R. Wescott, M. H. Dodge, A. Darcus, F. D. Barber, J. Powlison, and G. Behnke.

Sinclair Refining Co. is exhibiting its lubricants for construction equipment at Booth 1226, with Staff Engineer Clark C. Randall in attendance.

Solvay Sales Division, Allied Chemical & Dye Corp., is located in Booth 1033. H. R. Smith, C. M. Adams, Jr., Norm Torgerson, R. A. Scott, W. L. Ridpath, "Chuck" Hook, and Dick Rose are in attendance, to answer questions and provide information on the various uses of calcium chloride in road con-

struction and maintenance.

Sterling Machinery Corp. is featuring new lines of self-priming pumps, power-driven diaphragm pumps, electric welders, power-driven lawn mowers, a gasoline-engine-driven table saw, and a new gasoline-engine-driven fire-fighting pump—at Booth 1216 in the Exhibition Hall. Standard Sterling pumps, hoisting equipment, electric generating plants, and saw rigs are also on display.

Tampo Mfg. Co. has its exhibit in Space 3828, South Concourse, and is showing a 3-wheel 10 to 12-ton variable-weight roller with five speeds forward and five reverse, Models R-9 and R-13 pneumatic-tire rollers with oscillating axles, and Tampo sheepfoot rollers.

The Timken Roller Bearing Co. is displaying its roller bearings and rock bits at Booth 1419-1618. Company personnel in attendance there includes L. M. Klinedinst, W. B. Moore, P. J. Reeves, P. C. Poss, S. C. Partridge, M. H. Kuhl, S. M. Weckstein, Paul Haager, E. H. Austin, J. P. Roberts, and Howard Sauer.

Trackson Co. occupies Space 3208 to 3805 in the South Concourse. The tractor-excavator equipment it is displaying includes the T2, IT4, T6, and T7 Traxcavators. On display, too, are land-clearing units, the TD8 Treedozer and the BR8 brush rake. Visitors to the booth will also have a chance to inspect the MD7 Pipelayer. Personnel of the Trackson sales, service, and engineering departments are in attendance.

Tractomotive Corp. is exhibiting its Tracto-Shovel units as part of the Allis-Chalmers display at Booths 3204, 3401, and 3601.

Tyson Bearing Corp. has its exhibit in Booth 1228 where its line of tapered roller bearings may be seen. Company representatives on hand to greet visitors include H. I. Lewis, President; W. H. Oexle, General Sales Manager; H. J. Deal and George C. McMullen, Vice Presidents; and Ivan C. Mann, Assistant Sales Manager.

The Warner & Swasey Co. is featuring the operations of its Gradall in Space 3821 of the Road Show. On-the-job pictures of some of these multi-purpose earthmovers are being shown.

Waukesha Motor Co. is showing three new models of 6-cylinder diesel engines at Space 3203-A and 3214 in the South Concourse. The first is a 1,197-cubic-inch model rated at 190 to 210 hp; the second is a 775-cubic-inch diesel rated at 150 to 180 hp; and the third is a small model of 265-cubic-inch displacement rated at 40 to 53 hp. Waukesha is also exhibiting new gasoline power units: a line of overhead valve engines from a small 4-cylinder model of 120-cubic-inch displacement; new 6-cylinder units of 180, 265, and 320 cubic inches; and a small 4-cylinder L-head engine of 61 cubic inches. Waukesha representatives are headed by J. G. Swain, Director of Sales.

The S. K. Wellman Co. has Booth 1236 where Velvetouch all-metal clutch plates facings, and brake lining for tractors and various types of earth-moving equipment are on display. Those on hand to answer questions include W. E. Canfield, T. A. Novotney, E. P. Cawley, S. E. Jacobson, G. L. Romine, G. O. Abell, E. E. Gassen, W. W. Nelson, and F. J. Lowey.

White Mfg. Co. portable asphalt plants, asphalt-heating kettles, asphalt surface heaters, lead melters, kerosene torches, concrete vibrators, and tractor (Concluded on next page)

Where GM "71" Diesel Service is Available

ALABAMA—Birmingham ARMSTRONG EQUIPMENT CO.

ALABAMA—Montgomery ALABAMA MACHINERY & SUPPLY CO.

ARKANSAS—Little Rock LEWIS DIESEL ENGINE CO.

CALIFORNIA—Los Angeles, Bakersfield ANDERSON-O'BRIEN COMPANY

CALIFORNIA—Lancaster LANCASTER ENGINE CO.

CALIFORNIA—Stockton MOORE EQUIPMENT CO.

CALIFORNIA—Berkeley WEST COAST ENGINE & EQUIPMENT CO.

CALIFORNIA—North Sacramento, Woodland CAPITOL TRACTOR & EQUIPMENT CO.

CALIFORNIA—Chico CHICO EQUIPMENT CO.

COLORADO—Denver THE COLORADO BUILDERS' SUPPLY CO.

CONNECTICUT—Hartford HOLMES-TALCOTT CO.

FLORIDA—Jacksonville GENERAL MOTORS CORPORATION

FLORIDA—Tampa DIESEL ENGINE SALES

FLORIDA—Tallahassee GENERAL ENGINE & EQUIPMENT CO.

FLORIDA—Tallahassee ARTHUR F. SWAIN CO.

FLORIDA—Ocala BAILEY MOTOR & EQUIPMENT CO.

FLORIDA—Miami GULF ENGINEERING CORP.

GEORGIA—Atlanta, Albany BLALOCK MACHINERY & EQUIPMENT CO.

GEORGIA—Waycross TRACTORS & EQUIPMENT, INC.

IDAHO—Boise, Pocatello OLSON MANUFACTURING CO.

IDAHO—Lewiston FRED M. VILES & COMPANY, INC.

ILLINOIS—Bellwood KENNEDY-COCHRAN CO.

INDIANA—Lawrence FLECH-MILLER TRACTOR CO.

IOWA—Cedar Rapids, Des Moines JAMES W. BELL CO., INC.

KANSAS—Wichita POWER EQUIPMENT, INC.

KANSAS—Scott City BEN HASZ

KANSAS—Garden City JONES BROTHERS EQUIPMENT & IRRIGATION CO.

KANSAS—Great Bend SCRANTON MACHINE & SUPPLY CO.

KENTUCKY—Lexington SHEPPARD & BOGIE EQUIPMENT CO., INC.

LOUISIANA—New Orleans, Lake Charles GEORGE ENGINE CO., INC.

LOUISIANA—Crawley CART-DUBUS

LOUISIANA—Monroe TAYLOR MACHINE WORKS

MAINE—Portland EASTERN TRACTOR & EQUIPMENT CO.

MARYLAND—Baltimore MCCLUNG-LOGAN EQUIPMENT CO., INC.

MASSACHUSETTS—Boston CLARK-WILCOX CO.

MINNESOTA—St. Paul, Duluth BORCHERT-INGERSOLL, INC.

MISSISSIPPI—Jackson, Louisville TAYLOR MACHINE WORKS

MISSOURI—North Kansas City K C DIESEL POWER CO.

MISSOURI—Springfield CHILES TRACTOR & MACHINERY CO.

MISSOURI—Chillicothe COOKE SALES & SERVICE, INC.

MISSOURI—St. Louis WESTERN MACHINERY CO.

MONTANA—Billings SEITZ MACHINERY COMPANY, INC.

MONTANA—Missoula, Kalispell MOUNTAIN TRACTOR CO.

NEBRASKA—Omaha FEHRS TRACTOR & EQUIPMENT CO.

NEBRASKA—Scotts Bluff THE COLORADO BUILDERS' SUPPLY CO.

NEVADA—Elko C. W. PAUL HARDWARE & MACHINERY

NEW JERSEY—Newark ESSEX WELDING EQUIPMENT CO., INC.

NEW MEXICO—Albuquerque THE HARRY CORNELIUS COMPANY

NEW YORK—New York City GRIFFIN EQUIPMENT CORP.

NEW YORK—Ontario INDUSTRIAL & MARINE EQUIPMENT CORP.

NORTH CAROLINA—Greensboro E. F. CRAVEN CO.

NORTH CAROLINA—Charlotte CONTRACTORS SERVICE, INC.

NORTH CAROLINA—Raleigh, Durham, Rocky Mount, Goldsboro DILLON SUPPLY CO.

NORTH CAROLINA—Wilmington R. F. HALL & SON, INC.

NORTH CAROLINA—Fayetteville PROCTOR-BARBOR CO., INC.

NORTH CAROLINA—Whiteville WHITEVILLE FARM EQUIPMENT CO.

OHIO—Steubenville RAY C. CALL COMPANY

OHIO—Cincinnati CARROLL-EDWARDS & CO.

OKLAHOMA—Oklahoma City DIESEL POWER CO.

OREGON—Portland, Eugene GUNDERSON BROS. ENGINEERING CORP.

OREGON—Coos Bay LILLEBO & MAGUIRE

OREGON—Klamath Falls WEST-HITCHCOCK CO., INC.

PENNSYLVANIA—Wilkes-Barre, Harrisburg, Williamsport STANDARD EQUIPMENT CO.

PENNSYLVANIA—Philadelphia FRANTZ EQUIPMENT CO.

PENNSYLVANIA—Pittsburgh HIGHWAY EQUIPMENT CO.

SOUTH CAROLINA—West Columbia BELL-LOTT ROAD MACHINERY CO.

SOUTH CAROLINA—Conway EASTERN SALES CO., INC.

SOUTH CAROLINA—Sumter MCLEAN FARM EQUIPMENT, INC.

SOUTH CAROLINA—Newberry RUFF BROS. IMPLEMENT CO.

SOUTH CAROLINA—Walterboro SIMMONS DIESEL & EQUIPMENT CO.

SOUTH CAROLINA—North Augusta SOUTHERN DIESEL CO.

TENNESSEE—Chattanooga NIXON MACHINERY & SUPPLY CO., INC.

TENNESSEE—Johnson City NANCE, INC.

TENNESSEE—Boxville STORY BROTHERS, INC.

TENNESSEE—Memphis LEWIS DIESEL ENGINE CO.

TEXAS—Houston, McAllen, Corpus Christi, Dallas, Livingston, Wichita Falls, Tyler, Beaumont STEWART & STEVENSON SERVICES, INC.

TEXAS—Plainview HAYNES MACHINERY CO.

TEXAS—El Paso EQUIPMENT SUPPLY CO., INC.

UTAH—Salt Lake City CATE EQUIPMENT CO., INC.

VERMONT—Barre A. M. FLANDERS, INC.

VIRGINIA—Richmond, Roanoke BEHNS EQUIPMENT CORP.

WASHINGTON—Seattle LOMEN EQUIPMENT CO.

WASHINGTON—Seattle EVANS ENGINE & EQUIPMENT CO.

WASHINGTON—Bellingham BELLINGHAM ENGINE & EQUIPMENT, INC.

WASHINGTON—Ellensburg INLAND EQUIPMENT CO., INC.

WASHINGTON—Spokane FRED M. VILES & COMPANY, INC.

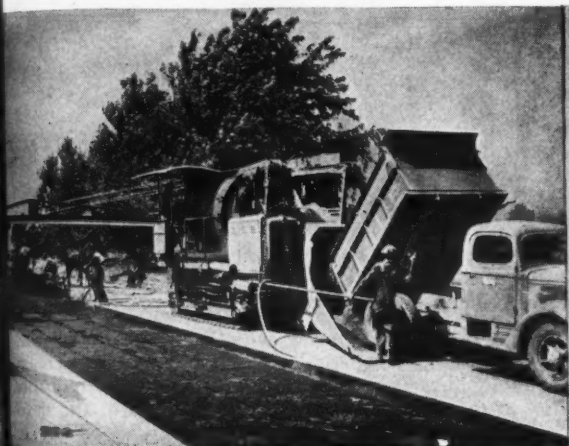
WISCONSIN—Milwaukee DROTT TRACTOR CO., INC.

WYOMING—Casper GERING EQUIPMENT CO.

WYOMING—Casper STUDER TRACTOR & EQUIPMENT CO.

Service also obtainable from:

General Motors Overseas Operations
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For Allis-Chalmers Tractors—All A-C dealers
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Distributor to service them

GM Distributors and Dealers span the world. They are never far away—ready to answer an owner's call for a quick adjustment, a repair, or a genuine GM Diesel part. Their factory-trained service men take an interest in seeing that these engines keep humming, and making sure each one delivers its best.

This is another "plus" for GM Diesel owners—another assurance of complete satisfaction with the engine they buy.



DETROIT DIESEL ENGINE DIVISION

Engines... Up to 200 H.P. DETROIT 25, MICHIGAN MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS



American Road Equipment Co. is exhibiting its new No. 6 hydraulic motor grader at the Road Show.

ARBA Convention And 1948 Road Show

(Continued from preceding page)

loaders are set up in a representative display at Booth 3005. W. McK. White, W. McKean White, Jr., and M. A. King are on hand to show visitors around.

White Motor Co. is showing two trucks of advanced design for use in highway construction. Powered by a White Super Power engine, these vehicles are intended for either on or off-the-highway use. J. N. Bauman, Vice President in Charge of Sales; Robert Cass, Assistant to the President; H. R. Stickel, Manager, Fleet Sales Division; and H. P. Starbird, Sales Research Assistant, are in attendance in Space 3820.

Wico Electric Co. is located in Booth 1610. Its exhibit consists of a complete line of high-tension magnetos in 1, 2, 4, and 6-cylinder models suitable for base, flange, or vertical installation. Also shown are magnetos of the fly-

wheel type for installation on the smaller single and two-cylinder gasoline engines used in the construction industry. Company representatives in attendance include H. M. Sauers, Vice President in Charge of Sales; C. G. Waters, Manufacturing Sales Manager; C. L. Allen, Trade-Sales Manager; M. F. Allen, Service Manager; and D. G. Forbes and O. H. Tift, Sales Engineers.

Willett Mfg. Co. has Booth 2110 where the new Willett power reversing trip-blade snow plow and the improved Willett Model HRT truck grader are being shown, mounted on a truck. The plow, which is being shown for the first time, has all controls located in the truck cab. Charles G. Willett is in charge of the exhibit.

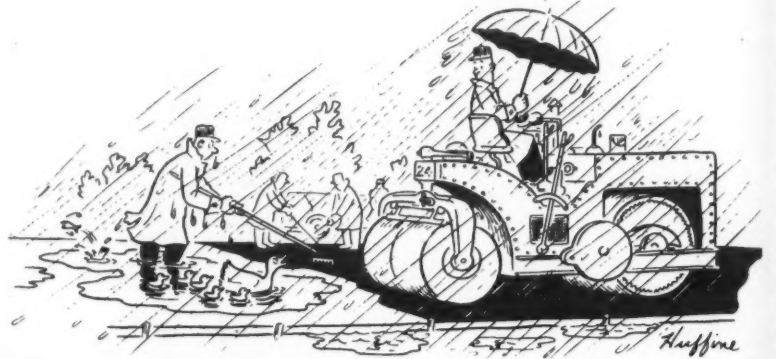
Williams Form Engineering Corp. has its exhibit in Booth 1822, Mezzanine Floor, where the Williams line of concrete form hardware and accessories will be on display. Among them are the company's new form aligner and combination bolt clamp. A limited number of the new Williams catalogs on form engineering are available there.

Williams Patent Crusher & Pulverizer Co. is introducing its Super-Slugger heavy-duty hammermill at Booth 3868. The No. 445, which it is showing, is designed to take stone from a 1 1/4-yard shovel and reduce it to 2, 1 1/4, or 3/4-inch sizes in one operation.

Worthington Pump & Machinery Corp. and its subsidiary, Ransome Machinery Co., are displaying Blue-Brute portable air compressors, rock drills, air tools, drifters, portable self-priming centrifugal pumps, semi-portable air compressors, utility compressors, porta-

ble concrete mixers, Hi-Up truck-mixers, horizontal truck-mixers, big stationary mixers, and concrete pavers. The following staff members are presiding at Booths 3207-3014: Assistant Vice President and Manager, Construction Equipment Department, C. F.

Oechsle; Field Sales Manager W. J. Fleming; Ransome Sales Manager W. F. Lockhardt; J. S. Clinger, J. S. Hazen, H. W. Stoddart, V. H. Berg, J. R. Williams, all product division managers, and various sales, service, and advertising personnel.



Courtesy of Collier

NOSTRIP makes better paving jobs, even with wet aggregate!

No longer is it necessary to postpone bituminous pavement construction due to rainy weather. NOSTRIP, the all-year additive for tar and asphalt, will give you a better, more durable job under the most adverse conditions.

NOSTRIP enables you to coat wet aggregate with RC and MC cut-back asphalts, SC road oils, and liquid tars. Furthermore NOSTRIP greatly increases the resistance of any bituminous films to stripping in the presence of moisture, and reduces loss of stability of the finished pavement structure due to the detrimental action of water or water-vapor. Experience proves that NOSTRIP increases the durability and life of bituminous mixtures as measured by retained strength after long periods of exposure.

Count up the advantages of NOSTRIP:

1. Aggregate can be wet or dry in surface treatment, seal and tack-coating, cold plant-mix, and mixed-in place construction.
2. No delays due to rainstorms.
3. Halves the blading and mixing time for road-mix.
4. Tested and approved by official research authorities.
5. Authorized for Federal Aid Roads.
6. Can be added in the field or at the refinery.

Demand a proven and approved anti-stripping additive with a record of many years' successful service in all parts of the world. Write us for specific information on how NOSTRIP can help you.

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CONCRETE VIBRATION INTERNAL EXTERNAL

UP TO 15,000 VPM



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Write for free
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1500 WATT
PORTABLE

- For Operating Power Tools
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"U.S." BUILDS A COMPLETE LINE of Gasoline and Diesel Electric Plants up to 140 KW—for stand-by, continuous duty, battery-charging, and portable uses. Skids, rings, porter bars, and trailer mountings available. Write for literature, stating type of unit and capacity required.

UNITED STATES MOTORS CORP.
554 Nebraska Street Oshkosh, Wisconsin
Factory representatives strategically located throughout U.S.A. and Canada.

World's Tallest Dam To Be Built in India

Water is part of India's enormous natural wealth. If properly exploited, it has been estimated that it could make that country one of the top power-producers in the world. In the past, little has been done to develop this potential energy. But the new National Government of India is working on a dozen or more hydroelectric schemes to provide approximately 4,000,000 kw of electric energy for plants now being set up or planned. Objectives also include high-level irrigation and navigation.

The most spectacular project is a dam across the Kosi River near Barah-shetra in Nepal. The dam will rise 750 to 850 feet above bedrock, and will be the highest dam in the world. (Boulder Dam is 730 feet high.) The power station at the dam will have a stalled capacity of 1,800,000 kw. It will make possible the irrigation of 1,000,000 acres of land in Nepal and 2,000,000 acres in Bihar, thus providing an estimated annual

addition of 1,000,000 tons to the food production of the area. Another benefit is that the river channel, which has changed its course nine times and devastated approximately 4,000 square miles of land in Nepal and Bihar, will be stabilized and made fit for navigation.

Another important dam will be built across the Godavari River, near Polavaram, about 20 miles above Rajamundry in Madras province. It will cost an estimated \$250,000,000, and will take eight years to complete. American contractors have already been invited to get in touch with the Madras Public Works Department for construction contracts. It is anticipated that the major portion of the construction machinery will be obtained from the United States. The dam will be 420 feet high and 6,000 feet long, and will be made of concrete. Excavation for the foundation will be about 22,250,000 cubic yards, and the dam will require 8,020,000 cubic yards of concrete. The project, it is estimated, will irrigate 2,000,000 acres of land and generate

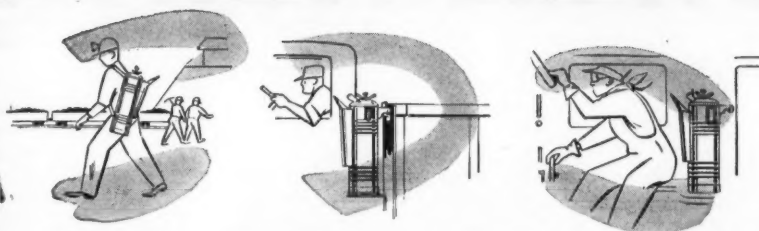
100,000 kw—with provisions for doubling that figure.

Construction has begun on the \$150,000,000 Hirakud Dam on the Mahanadi River near Sambalpur in Orissa. The dam will be 150 feet high and 3 miles long. Six irrigation channels will be taken out from the reservoir to irrigate over 1,000,000 acres of land annually. Hydroelectric power will be generated to the extent of 350,000 kw.

A multi-purpose project entitled the Damodar Valley project is expected to provide irrigation for 800,000 acres and generate a peak load of 300,000 kw. A Damodar Valley Corporation, modeled on the Tennessee Valley Authority, has been created to administer the operations.

Other projects are the Tungbhadra in Madras province, the Rihand in the United Provinces, and the Bhakra in the East Punjab. Dr. J. L. Savage, American expert on dam construction, and the International Engineering Co. of Denver, Colo., have been working with the Indian engineer.

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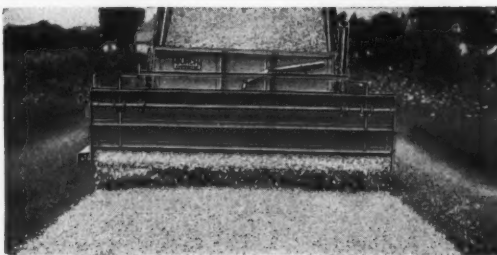
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See pages 142 & 143

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See pages 142 & 143

Highway Shop Built Of Brick and Steel

New Building Is Centrally Located for Maintenance Of Equipment in Division Comprising 28 Counties

✦ DIVISION 5 of the Georgia State Highway Department, with headquarters at Savannah, will soon be served by a modern shop which is being constructed at Glennville in Tattnall County. The Peach State, largest in area east of the Mississippi River, is divided into five highway divisions. The Savannah Division, comprising 28 counties, is roughly about 150 miles square. It extends along the Atlantic Coast from the South Carolina to the Florida border, and inland to neighboring Divisions 2 and 4 with headquarters respectively at Augusta and Tifton. Savannah, where the division headquarters are located, is at the extreme northeast corner of the division.

The present shop at Swainsboro is actually located within the Augusta Division, beyond the territorial limits of the Savannah Division, even though it has served Division 5 for the past twenty years. The new shop at Glennville, of brick and steel construction, is centrally located to the entire division. It is the policy of the State Highway Department to locate the maintenance shops centrally in each division in order to save considerable time and expense on transportation, and to get equipment repaired and back in operation as promptly as possible.

Work on the new shop, which is estimated to cost around \$50,000, started last summer and the building will be ready for occupancy some time this summer. It would already have been completed if it had not been for material shortages, with long delays especially in obtaining the steel and brick. The major part of the construction was performed by the State with hired labor, but subcontracts were awarded for the floor, slate roof, and the plumbing.

Five-Acre Site

The shop is located on a 5-acre site fronting on State Route 196. The land was donated by the City of Glennville. The tract is flat, with a well drained sandy soil, and is spacious enough so that other structures such as grease pits, storage sheds, etc., may be added at a later date to meet future needs. The new building, a one-story structure, is 140 feet long x 80 feet deep. The northeast side, which is one of the long dimensions, faces the state road running between Glennville and Hinesville.

The red-brick walls are 12 inches thick, enclosing a 6-inch reinforced-concrete floor. The walls support six steel trusses set on 20-foot centers across the shorter dimension of the building. From the floor to the bottom of the steel the vertical clearance is 14 feet. The trusses hold up the roof which is made of pine sheathing covered with slate.

In the front wall is a small entrance door which leads directly into the shop offices and storeroom. This area measures 30 x 60 feet, and is enclosed by brick partition walls. The rest of the building is all shop area with five doors entering it. In the rear wall are three doors, all 12 feet wide x 12 feet 6 inches high. Each of the side or end walls has a centrally placed door 14 feet wide x 12 feet 6 inches high. All of these large doors are of the overhead rolling type.

Well Lighted

Natural lighting is a feature of the building design. On all sides are large windows fitted with translucent glass.

The lower panel in each window opens, as do the two middle panels, to afford good ventilation. The shop is expected to be cool in the summer and warm in the winter. Hanging overhead lights will provide artificial illumination. The circulation of air will be helped by the high roof, which measures 30 feet from the floor at the peak of the truss.

Just under the roof trusses, steel I-beams crisscross the shop from one end to the other. Chain falls will be attached to the beams to permit the movement

of heavy machinery and equipment. One beam runs the length of the structure between the two end doors. Other beams cross the building at each of the three other big doors. Thus the hoists can pick up a load from a truck as it backs up to one of the doors, and move it to any desired part of the shop.

Equipment Repairs

The division shop will be utilized chiefly for the maintenance and repair of highway equipment, and not for storage. Each county in the division has a maintenance patrolman—some have two—who looks after the equipment used in that county. Typical equipment for one of these units consists of from two to four trucks, a motor grader, and a bituminous heater used in maintenance patchwork.

These machines are generally kept in a barn near the residence of the maintenance patrolman.

Working out of the division shop are up to five mechanics who go out in the field to make repairs on the spot whenever a machine breaks down. Only when repairs cannot be made in the field is the piece of equipment brought in to the shop on a transfer trailer truck. The mechanics use a pick-up truck on their trips. It is outfitted with tool boxes filled with whatever tools are necessary for the job at hand.

If an engine has to be replaced in a truck, for instance, the usual practice is to take the new or rebuilt engine out to the truck and install it as a field operation. This is done with the help of a

(Concluded on next page)

EQUIPMENT WITH



chain fall hooked to the limb of a nearby tree. Then the old engine is brought back to the shop where it is repaired or overhauled and put into condition so that it will be ready when needed. This equipment maintenance, both shop and field, is under the direction of the Division Mechanic.

Another function of the shop is the maintenance of road signs used in the division. One section of the building will be given over to this work which is supervised by the Sign Foreman.

Personnel

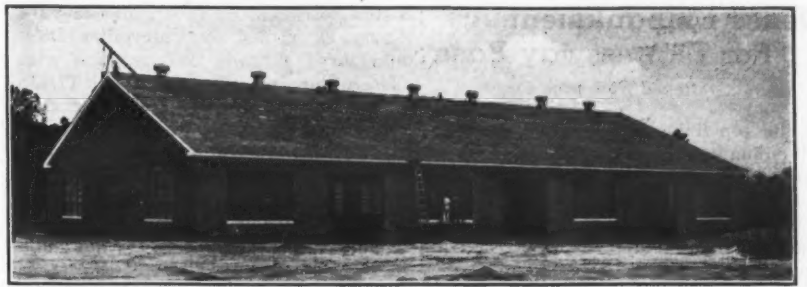
Plans for equipping the shop have not been fully decided, but it is expected that new machines will be installed. The force hired by the State for the construction of the building included three

masons and twelve laborers. G. A. Stockton was Foreman in charge of the building. The new Glennville shop is located in the residency of R. E. Carswell, Resident Engineer. J. O. Bacon is Division Engineer of Division 5 with headquarters at Savannah.

The Georgia State Highway Department is headed by J. C. Beasley, Director, with W. R. Neel, Deputy Director and State Highway Engineer.

Pressure-Grouting Tools

A booklet on pressure-grouting equipment has been issued by The Prehy Co., Inc., 420 Lexington Ave., New York 17, N. Y. It also describes pressure-grouting methods, applications, and materials, and features the



C. & E. M. Photo

This is the rear of the new Division 5 shop at Glennville, Ga. The three doors on this side are each 12 feet wide x 12 feet 6 inches high.

Prehy Type S grouter.

Pressure grouting is recommended by Prehy for operations such as cementing fractured rock, restoring ruptured masonry, sealing fissures, soil stabilization,

etc. The catalog covers in general the method of performing these operations, the consistencies of the mixtures to be used, preliminary work, and other points of interest.

Complete instructions are given for operating the Type S grouter, including loading, discharging, valve operation, reloading, agitating, and cleaning. Photographs illustrate the applications of pressure grouting and the operation of the pressure-grouting equipment. The Prehy concrete gun is also described.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 42.

Hydraulic Equipment For Subsoil Studies

A hydraulic testing drill for determining subsurface conditions is made by the New York Engineering Co., 75 West St., New York, N. Y. The unit weighs about 800 pounds complete, and is featured by its portability and quick set-up. Its weight includes enough casing and drill tubing for 50-foot drilling depths, plus the small tools necessary to set up and operate the drill. A gasoline pumping unit weighs an additional 50 pounds.

The Empire hydraulic testing drill operates on a hydraulic-jetting method of drilling. It consists essentially of a gasoline-driven force pump, casing, drill tubing, cutting shoes, and various tools. The casing is 2½ inches in diameter and is made of a high-carbon cold-drawn seamless steel tubing. The tubing is upset and thickened on each end, and a special square resistance thread is then machined on these upset ends. This is said to give a flush joint on the inside and outside of the casing and to eliminate the need for separate couplings. The hydraulic drill tubing is 1½ inches in diameter and has tapered threads machined on the ends. Both casing and drill tubing are made in 4-foot lengths.

In operation, the cutting shoe is screwed on the lower end of the casing. The jetting bit is coupled with the hollow drill tubing and operates inside the casing. The bit is perforated so that churning the jetting tools up and down causes the material at the bottom of the hole to be loosened and carried upward by the water. The water is forced through the perforated jetting bit by the gasoline-driven pump.

According to the manufacturer, it is sometimes possible to wash down without casing for quite a distance before the hole begins to cave and the casing has to be inserted. A heavy wooden maul is used to drive the casing when this becomes necessary. When the hole is finished, the casing is pulled out by two chain tongs clamped to it.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 86.

Euclid Personnel Changes

D. R. Anderson has been appointed Manager of the Hibbing, Minn., branch office of The Euclid Road Machinery Co. He is succeeded as Service Manager at Euclid's Cleveland plant by J. M. (Jack) Fairbanks. Mr. Fairbanks will have charge of all home office and field service functions and personnel.

"GUTS"

The pictures show the battleground, and the headline is the battle cry that echoes the thoughts of Perry McDowell, job superintendent for the Natt McDougall Co., to wit:

"Caterpillar" equipment is tops when a fellow has a heavy construction job to do. It has the guts to stand tough going, such as we have on this Buford Creek job."

This operator isn't alone in naming the ability to "stand up and take it" as the Number One requisite in earthmoving equipment. Contractors are virtually unanimous on that point.

An equipment setup for handling an entire project from start to finish with the products of one manufacturer under the service facilities of one dealer organization is a close second . . . because of its obvious advantages toward keeping the job moving and holding down costs. "Caterpillar" equipment is tops in meeting that requisite too. It is today the most complete line in its field—with versatility, performance, and parts-and-service facilities at their highest level in "Caterpillar" history.

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FOR A FIGHT...



TO A FINISH

ANYON CITY, OREGON—On this project the Natt McDougall Co. used two "Caterpillar" D8 Tractors with 85 Bulldozers, a No. 12 Motor Grader, a D13000 and a D6800 Engine driving portable compressors for air and jackhammers.

(Typical current standard-model prices, without auxiliary equipment, are: D8 Tractor, \$11,500; No. 12 Motor Grader, \$9,925, all prices F.O.B. Peoria.)

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DIESEL

ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Dense Embankment For Expressway Base

(Continued from page 6)

in the top 6 inches of native ground. All embankments above that point were compacted to the extraordinary high field density of 100 per cent.

In order to get this result with the least possible delay, F. A. Harris of the Texas Highway Department laboratory on the project developed a small sampling device, to take samples of each lift as work progressed. The device was designed to remove small undisturbed samples with the aid of a driving collar, then check their specific gravity on a small set of geologists' scales against a previously determined laboratory weight. The operation requires but a few minutes, and any lift can then be rolled to its ultimate completion before the next layer is put in.

Soils under the expressway location were mostly clays, with plasticity index ratings of 25 and over. The natural ground was often saturated with moisture far beyond the optimum Proctor compaction ratio, and it had to be processed, aerated, and dried in order to do anything with it.

The Houston expressway happens to be adjacent to the main headquarters, in the city, of the prime contractor, Brown & Root, Inc., and it was a customary practice to pull earth-moving equipment from this yard as needed. Dirt-moving went forward on a basis of 10 hours a day, and the embankments were processed as far ahead as possible.

Equipment Used

The main earth-moving fleet con-

sisted of two LeTourneau 12-yard Carryalls, pulled by Caterpillar D8's; and three 10-yard LeTourneaus with Caterpillar D7 or International TD-18 prime movers. Four TD-18's and D7's with cable-controlled Bucyrus-Erie and LeTourneau bulldozer blades assisted as pushers and leveling machines.

Because of the high moisture content, extensive water-truck equipment was not required. During the hot summer months of 1947 a few dry spots developed, and they were treated from a 1,000-gallon tank mounted on a Ford truck. Water came from the city supply system.

The job was equipped with five separate tandem sheepfoot roller units, mostly LeTourneau and Grace, ballasted to 250 pounds of pressure per square inch of sheepfoot tamper surface. This exceeded the requirements of the specifications by 80 pounds.

Compaction specifications were clear. They said, in effect, "You can use any method, any equipment you choose, but you must give us 100 per cent densities. We mean it."

Carryalls and tractors scattered over the landscape and went to work. The top material was stripped off and stockpiled for later use in filling the outside of slopes. By the time the machines got down to solid material, they were in a thick, viscous clay, soggy and wet.

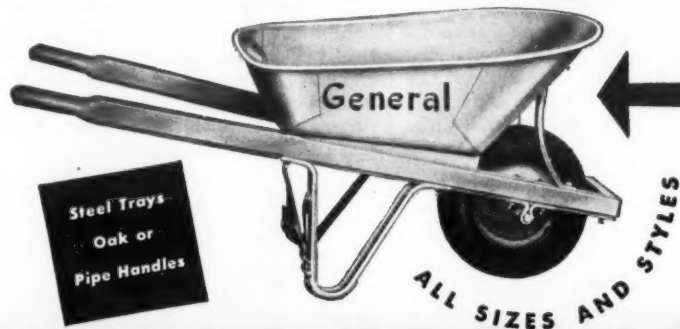
Extensive compaction experiments were then tried. Sheepfoot rollers made dozens of passes, but the required compaction was secured only in those few areas where moisture happened to be around 20 to 22 per cent, the optimum for that soil. Obviously something else had to be tried.

Motor graders came in and ripped the

(Continued on next page)

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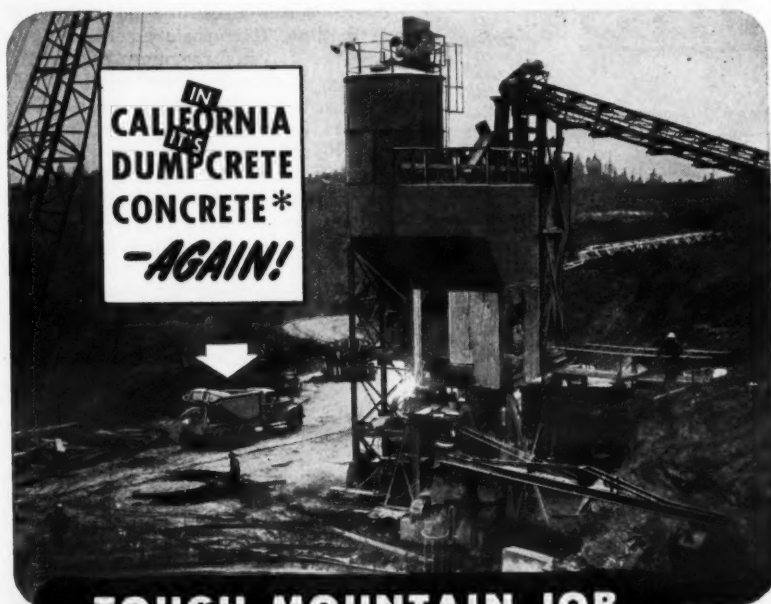
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formation about 9 inches deep with their scarifier teeth. Sheepfoot rollers made a "dry run" to break up the clods. More scarifying and blading followed. It was soon discovered that the only way the high density could be obtained was to mix and blend the wet with the dry until the lift was homogeneous, and within a per cent or two of optimum, before the rollers would develop the required compaction.

Alternate wet and dry places also gave trouble. These had to be evened up. Development of this dense compaction of course lowered the natural ground, and additional material then had to be hauled in from borrow cuts to bring it back to grade line.

When the subgrade below the embankment level had been treated for 6 inches of depth in this way, motor graders then went to work to dress the earth down to close tolerances. The Texas Highway Department engineers, anxious to get a perfect asphalt seal underneath the embankments, required the earth to be dressed dense and clean to a tolerance of $\frac{1}{2}$ inch in 50 feet. Contractor's surveyors blue-topped the area, and motor graders skimmed all loose material down to the true hard grade.

An Etnyre pressure distributor then came in with Texaco OA-55 asphalt, at a temperature of 320 degrees minimum, and shot the ground with a gallon of the material per square yard. The asphalt was quite stable. It froze almost on contact, leaving an impervious seal about $\frac{5}{64}$ inch in thickness.

Dirt Work Over Seal Coat

The problem at this point was how to start the embankment over the thin asphalt membrane without puncturing it by heavy equipment. This was neatly solved by some practical common sense.

Carryalls first stockpiled some dirt, carefully selected from the borrow for proper moisture content, on one side of the lift. This dirt was then worked out over the asphalt in a 9-inch layer by one of the most skilled bulldozer operators. As he developed this dirt base over the asphalt, the Carryalls dumped their loads ever closer to the edge, and the bulldozer developed more and more area until the first lift had been completed over the asphalt membrane.

Sheepfoot rollers then moved in and compacted this lift the same way preparation work had been done. The lifts then followed in order until the embankments were finished.

At bridge abutments, all embankments were finished to a full 2 to 1 slope, to give plenty of solid foundation material under the abutments. The side slopes were generally left on a 2 to 1 ratio, and dressed by a grader blade.

As each embankment was finished, it was necessary to finish the asphalt seal encasement. The top surface was again blue-topped, even more carefully this time due to break points of grade, and a motor grader removed all material down to the line. All loose material was cleaned off the sides. At the toe of each embankment, workmen dressed the embankment back until they exposed the asphalt from the lower membrane.

Some OA-55 was again brought in and shot 1 gallon per square yard over the top of the embankment. A hot pot and a long hose were used near the edge to spray the material on the side slopes. Full coverage was obtained. Since there has been a great deal of doubt expressed in various quarters whether OA-55 will stand on a 2 to 1 slope without running, it may be said here that the material froze immediately on contact and stood up even in high summer temperatures without sagging or running.

Each embankment was thus protected on the bottom, top, and both sides by a complete asphalt encasement, joined at the edges, with the dirt therein

processed to very high compactions. There were many Proctor tests of from 105 to 109 per cent on embankment tests, but there were none below 100 on finished work. All embankment lifts were carefully checked.

Sub-Base Goes In

To go on top of the compacted earth, engineers had designed a special, select flexible sub-base to bear the beating of traffic on the concrete pavement. The material selected was a combination of washed sand and oyster shell, both materials being available about 5 miles from the job.

A subcontract was let to Parker Brothers to mix and deliver this material to the job site. The company's contract included the pugmill mixing, in its commercial plant, of from 30 to 35 per cent of sand with the dredged oyster shell.

Parker Brothers worked long hours keeping this material on the job as rapidly as it was needed. It often

(Concluded on next page)

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Soldier Field - Chicago, Ill. - July 16-24

Dense Embankment For Expressway Base

(Continued from preceding page)

hauled from 5 a.m. until nearly midnight, using a fleet of fifteen 6 and 8-ton White and Diamond T dump trucks. On peak days the company delivered 1,500 tons of this material.

The same practical problem again arose of how to lay this material without disturbing the asphalt seal. The same solution was worked out. The trucks end-dumped near the fresh asphalt, and a bulldozer shoved a thin 4½-inch lift out over the membrane. When the first 4½-inch lift was finished, it was compacted mostly by heavily ballasted Bros pneumatic-tire rollers. The top of the second 4½-inch lift was slush-rolled with pneumatic rollers and sprinkling, to develop a fine, smooth, dense surface. Extensive surveying and motor-grader work was used to get this sand-shell sub-base down to maximum compaction, and yet

to leave it true to grade at the break points. The expressway pavement slopes generally ½ inch to the foot for the first 25 feet, and drops to ¼ inch to the foot from that point to the storm-sewer intakes.

The top of the sub-base was then sealed with another coat of OA-175 at an application rate of 0.3 gallon a square yard, and it was tied down to the lower seals. About 15 pounds of minus-¾-inch fine aggregate was scattered over this top seal, the stone was pneumatic-rolled to bond as much of it in as possible, and the job was then ready for concrete pavement.

Conclusions

Severe rain later in the season after many of these embankments were finished failed to affect them in any way. Ordinary automobile or truck traffic could maneuver without developing any soft spots, or without breaking the asphalt seal. Many a concrete-paving day between rainstorms was possible on this job, when concrete jobs else-

where around Houston were idle, because of the excellent base.

Operators and others who worked on this part of the project agreed unanimously that it was one of the toughest embankments they ever built, largely because of the excessive moisture condition in many of the borrow areas.

They did point to the finished embankments with pride, when all could see how stable and durable they were.

All dirt work was under the general field supervision of Roy Hughes, Excavation Superintendent, working under Howard Payne, General Superintendent for Brown & Root, Inc.

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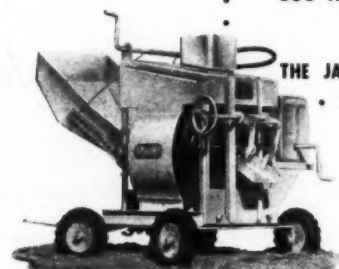
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Contractors and Engineers Monthly - Red Request Card - July '48

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Spooling Device Is Truck Winch Feature

A truck winch which features an automatic spooling and tensioning device is made by Gar Wood Industries, Inc., Wayne, Mich. The Gar Wood Reel-Rite winch is designed to eliminate cable damage and breakage caused by loose or crossed coils.

It is said to spool smoothly and tightly at all times. The tensioning sheaves apply tension even when the cable is slack, the manufacturer points out; as a result, the cable is laid in smooth and closely coiled layers. The spooling unit is not mechanically linked to the winch drive, and it is designed to compensate for any change in rope diameter, stretch, speed, or wear.

Other features claimed for this winch include a detachable back-draft clutch, heat-treated alloy-steel shafts, ball-bearing-mounted worm gear, automatic safety brake, and patented flexible suspension. The Reel-Rite winch is pro-

duced in one model with a capacity of 20,000 pounds. But models with capacities of 15,000 to 30,000 pounds are contemplated.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 10.

Invest in U. S. Security Bonds.

Golden Year for Bullard

Fifty years of providing "Everything for Safety" is the record completed this year by the E. D. Bullard Co. of San Francisco, Calif.

Included in the safety equipment manufactured by Bullard is the Hard Boiled Hat, introduced in 1919.

Attention Contractors & Engineers

Do you know that an Abrams Aerial Survey will give you more data on your project per dollar invested than any other surveying method?

Let one of our competent engineering consultants call on you and outline a plan that will cut time and costs from your original estimates.

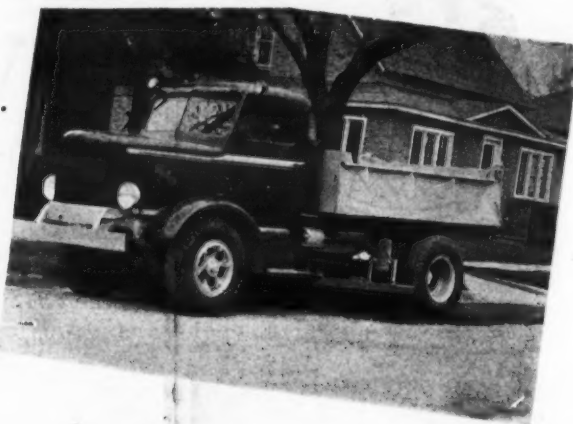
This service is confidential and puts the client under no obligation. Write us stating full particulars and results expected and we will make a proposal that we know will be of interest.

ABRAMS AERIAL SURVEY CORPORATION
606 East Shiawassee
Lansing, Michigan



• Pneu-Hydro SNO-LODER saves money on both initial cost and maintenance, yet handles snow load-for-load with larger self-propelled units. With the SNO-LODER, the loading truck pushes with its tailgate against the SNO-LODER bumper. As the truck pushes, one man handles all the controls, steering the unit into the windrow, operating the clutch and the load distributor chute. Safety brake allows complete control on grades, while the helix blade feeds snow to the conveyor.

• Pneu-Hydro EDGEMASTER is an economical aid to faster, cleaner roadside mowing. Mower blades are resharpened by EDGEMASTER without laborious hand filing at the phenomenal rate of a foot a minute. Simply operated, it handles any length blade, sharpening two edges of teeth at once. Powered by 1/2-hp. electric motor, EDGEMASTER is sturdily built of piping and heavy gauge steel. Write for illustrated folder.

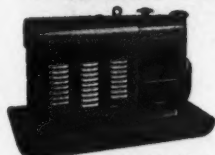


• Pneu-Hydro Road Planers meet all requirements for low cost, heavy-duty road maintenance. Road Planers are available with either hydraulic or pneumatic controls in 9, 10, or 12 foot widths. Both types are controlled by dash-mounted valves. The entire unit rotates on a notched quadrant of 80 degrees, locking the channel at the most effective cutting angle. The tough steel mold board is curved and crimped, and equipped with a long wearing cutting bit.

• Send for complete and detailed literature on Pneu-Hydro road machinery. We are at the 1948 Road Show in person, and Pneu-Hydro equipment will be on display at the next Road Show. In the meantime, our equipment is receiving wide acceptance in the United States and South America.

PNEU-HYDRO ROAD MACHINERY CO., Cadillac, Michigan

MASTER COST-SAVING EQUIPMENT—FOR IMMEDIATE DELIVERY



Portable Gas-Electric Generator Plants, Sizes 500 to 17000 Watts (Catalog No. 815-A)



General Purpose Floodlights



Gas or Electric Concrete Vibrators (Catalog No. 689)



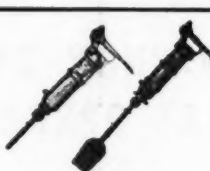
Gas or Electric Grinding Machines and Power Tools (Catalog No. 683)



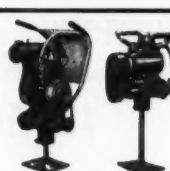
BIG-3 for Generation, Tool Operation and Concrete Vibration (Catalog No. 687)



Hand Tools for all Master Vibrators, BIG-3, and Grinding Machines (Catalog No. 683)



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Vibratory Concrete Finishing Screed, Sizes 6' to 36' (Catalog No. 596)



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Speedmaster and Cablemaster Hoists; 500 to 6000 lbs. cap. (Export only) (Catalog No. 706-A)



Send for illustrated catalog on any item to
MASTER VIBRATOR COMPANY
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SAVE Water-Hauling COSTS



1. Drilling Completed

Drill a permanent (or temporary) well in a jiffy right where you need water—with KA-MO Earth-Drilling Equipment. It pulls all dirt out, leaving a clean hole, into which a caisson or pipe is inserted and pump attached. Cost is so low you can abandon well—or pull up caisson or pipe and use elsewhere.

Wells up to 16" dia., 30' deep are often drilled in an hour. It's the inexpensive way to have water at any spot, or any number of spots, for construction jobs, parks, club grounds, cemeteries, farms, etc.

KA-MO Earth-Boring Tools also bore vertical "pilot" holes for posts, poles or piling; horizontal holes for pipe, tile, conduit; bores under highways, railroads, drains water from embankments, etc.

KA-MO Earth-Boring Tools can be mounted on any standard truck, moved at truck speed. Light weight, easy to handle. Drills available from 6" to 16" dia.



2. Drill lifts out the earth leaving clean hole.

Write for complete information.

KA-MO TOOLS, Inc.
2121 S. Troy St.
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GIVE THEM THIS DAY . . .

Help 230,000,000 children of the world to survive hunger and privation . . . contribute to this world-wide action for the suffering children of today—tomorrow's citizens . . . support the United States government foreign aid policy . . . build the Children's Century, the peace that can march forward on the feet of little children . . . GIVE THEM THIS DAY the American way . . . contribute through American Overseas Aid—United Nations Appeal for Children, 39 Broadway, New York 6, N.Y.

Trailers Speed Up Job-to-Job Moves

Concrete-Paving Outfit Made Mobile by Trailer Fleet Carrying Office, Machines, Repair Shop

BY using a fleet of heavy-duty trailers to excellent advantage, Koss Construction Co. has achieved a degree of mobility seldom seen in a heavy-duty concrete-paving outfit. Spare parts, office supplies, the repair shop, heavy equipment—the whole kit and caboodle, in fact—can be moved rapidly from job to job.

Last year this outfit stopped paving in Iowa, started loading up, and 12 days later was out in Wichita, Kans., paving again, with everything set up including the batch plant. Superintendent John Beuerlein estimates that his outfit can move to a point anywhere in the state of Kansas and be pouring concrete 10 days after finishing a job.

"The company was forced to streamline its operations", he explained. "When you have so much equipment, and so many spare parts, it really runs into a lot of man-hours to load it all out when a job is over."

The Koss solution has been the purchase of a number of heavy metal Fruehauf trailers. These carry all the supplies and parts needed on a big paving job, and the parts never have to be re-handled. In the trailers it's easy to classify them, store them in bins, and simply move the trailer from job to job with materials intact.

"It makes for efficiency, too", Beuerlein explained. "The men certainly get to know where every nut, bolt, pipe fitting, and mechanical spare part can be found."

Order in Which They Go

The spark plug of the whole outfit is Beuerlein's small private office and trailer, which usually pioneers the way to a new job. Pulled behind a pick-up truck, this trailer can move at 45 miles an hour, be on the job the same day it leaves the old one, and have a telephone line hooked up to the nearest town. In this office are the various forms and order blanks Beuerlein needs to get a



C. & E. M. Photo

This general view of the Koss field yard shows part of the company's mobile equipment. Even the metal shop in the center of the picture is mobile.

job under way.

Very shortly the big Fruehauf units hit the road. One big trailer carries all the lubricating oil and grease, as well as tires for automotive equipment. The company has standardized on lubricating oils, using Sinclair and Mobilube, and just a few barrels serve

diesel and gasoline engines alike.

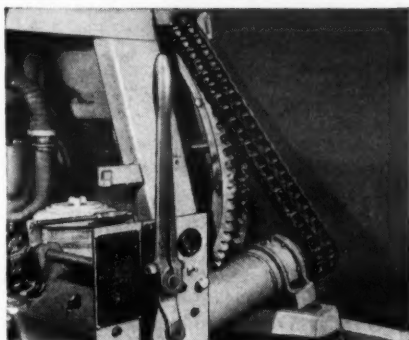
The main field office is likely to move along next. No need to dismantle file cabinets or move office furniture and blank forms. A truck simply hooks on to the trailer and it's on its way to the next job. One trailer carries nothing but automotive parts for the 20 trucks

on the job. Another holds nothing but spare parts for heavy equipment. Still another houses miscellaneous parts, paints, and so on.

Beuerlein has a very simple but efficient system of keeping his parts bins replenished. When a part needs to be replaced, the master mechanic orders two—one for the spare-parts trailer. After a few years, standardized as Koss is trying to become, the mechanics know what parts need replacing most often.

The biggest piece of mobile equipment is a complete machine shop, 20 x 40 feet. The sides of this shop fold up from the trailer to form a roof for the shed; canvas sides are then installed, a heating stove is set up, and presto! It's a comfortable heavy-equipment repair shop. One half of the shop is devoted to welding, the other half to heavy repairs. A big diesel-electric generator on the trailer in the center furnishes power.

In moving from job to job, some of (Concluded on next page)



THE CHAIN TAKES THE STRAIN

The exclusive Rex chain drum drive eliminates stresses and strains. The chain protects transmission . . . gears . . . shafting . . . power plant. It eliminates binding between drum and transmission as the truck chassis weaves over uneven ground. The chain effectively dampens vibration, assuring far less driver fatigue.

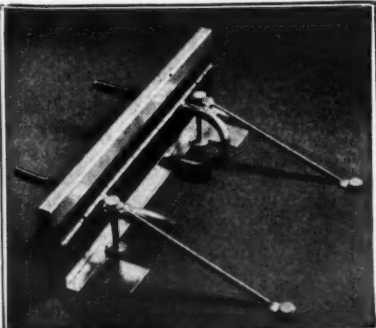
**Life-Saver
Cost-Saver
Time-Saver
REX
Hi-Discharge
Moto-Mixer**



CHAIN BELT
REX
COMPANY

Well Anchored Joints For Concrete Paving

Tested and Proved for the past 10 years



DOW-WELD

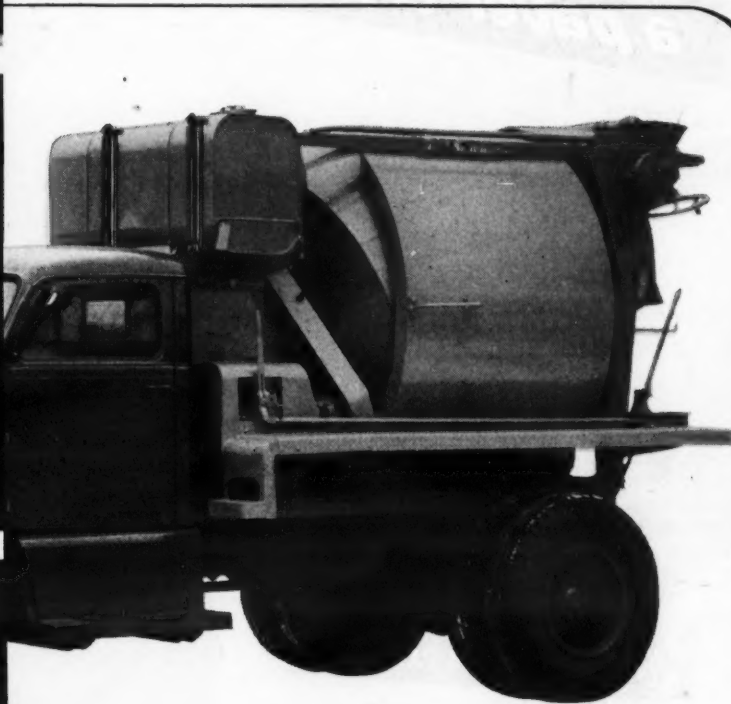
Assembled Expansion Joints

The DOW-WELD joint is delivered in the form of a rigid welded truss unit and is permanently anchored to the subgrade, thus insuring a true alignment of the dowels. Due to the staking device it is not necessary to disturb the concrete.

This joint has been extensively used for the past ten years on major highway and airport projects, and the results have been tested and proven to be satisfactory.

We shall be glad to furnish the location of such projects upon request.

DOW-WELD CO., Inc.
21st St. West of Howard, Baltimore 11, Md.



Lower Maintenance and Operating Cost

The Rex drum drive is a weight-saver. It eliminates the need of bulky, excessively heavy transmission cases, shafting, bearings, etc. This saving in weight here permits Rex to build added strength into parts where it is really needed . . . blades, drum rollers, drum shell and drum support. Here's why Rex gives you lower maintenance costs and assures less operating time.

Time-Saving, Fast Discharge

You'll save minutes every batch with Rex Moto-Mixers. Since Rex mixes in the discharge direction, the batch is always right up at the opening . . . ready to come out in a hurry. Deep spiral scoops speed the batch out *fast!* Remember, it's at the job site where speed is important to avoid holding up your customer's schedules.

For all the facts, see your Rex Distributor or write for Bulletin No. 468.
Chain Belt Company of Milwaukee, 1666 W. Bruce St., Milwaukee 4, Wis.

CONSTRUCTION MACHINERY

Moto-Mixers

Moto-Agitators



Koss Construction Co. Photo

Mobility is a keynote of the Koss paving organization. Long-range moves of heavy equipment are made by this International truck and Fruehauf trailer. The company can finish a job in Kansas and be pouring another anywhere in the state 10 days later.

Trailers Speed Up Job-to-Job Moves

(Continued from preceding page)

the batch-plant equipment and perhaps a few more heavy items are shipped on railroad cars. However, heavy low-bed trailers carry most of the paving equipment to the next job and then return to Des Moines headquarters to do other

work. The operators of these trucks are experienced by now in loading and unloading every piece of equipment, and setting up or tearing down a camp compares to nothing quite so much as a typical change of location by Barnum & Bailey's circus.

By reducing the hazy business of project mobilization and demobilization to an exact science, with much lower costs than were possible before

introducing these big trailers, Koss Construction Co. has whipped a problem that has plagued contractors for years.

New Hacksaw Frame

A newly designed hacksaw frame is announced by the Machine Rebuilding Co., Dept. C-301, 2738 Chene St., Detroit 7, Mich. Feature of the Rigid hacksaw frame is its one-piece steel-tube back fitted into a precision-machined cast-aluminum handle. This is said to permit tightening the blade to high tension, without twisting it or causing misalignment.

The Rigid frame is adjustable for 10 or 12-inch blades and all steel parts are cadmium-plated, according to the manufacturer. The machined blade holders are fitted into milled slots to prevent misalignment of the blade, and thrust is said to be directly behind the blade. The total weight of the Rigid hacksaw frame is 1 pound 6 ounces.

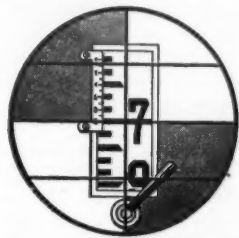
Further information may be secured

from the company, or by using the enclosed Request Card. Circle No. 76.

Nordberg Sales Engineer

G. B. Wright has been appointed Sales Engineer by the Nordberg Mfg. Co. Mr. Wright, who came to Nordberg from the Sterling Engine Co., Buffalo, N. Y., is associated with the Small Engine Department of the Heavy Machinery Division.

When You're On Target With a White...

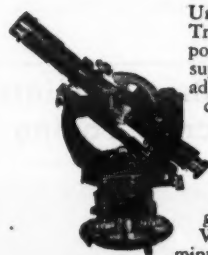


You're Absolutely Right

● You can be absolutely confident of precision results with White instruments. That's because every step in their manufacture is made with that thought in mind. For example, the metals used in making various parts are a special bronze, brass and nickel silver. Whenever advisable, individual parts are carefully heat-treated to remove all internal stress and strain.

● But that's only part of the story—all graduations on White instruments are guaranteed for accuracy—they're made by a special dividing engine in a totally enclosed heat-controlled, air-conditioned room. Graduating surfaces are grained Sterling Silver to reduce reflection and preserve accuracy.

● Finally—White instrument optics are coated—to transmit the brightest and sharpest possible image through the sighting telescope. Brightness is increased as much as 40 per cent because of increased light transmission—contrast is improved by reducing the haze caused by internal reflections.



Universal Level-Transit—an all-purpose instrument with super-accuracy on all adjustments. Rugged construction to stand on-the-job handling. 12" Telescope, 25 power, coated optics, horizontal guarded circle 4 1/2", Verniers read to 5 minutes, vertical arc 3".

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Jobs Done Quicker, Cheaper

Attached to Tractors, Bulldozers, Motor Graders and Scrapers, the Automatic Slope-Meters are in use on the construction of highways, airports, dams and building sites. Slope-Meters are compact, sturdily constructed instruments that will automatically show the operator the exact grade of slope on which he is working.

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NOWHERE ELSE

a paver crawler like this...



it's a
MULTIFOOTE
Lucmix 34E
DOUBLE DRUM PAVER

The MultiFoote Crawler—compare it with any other paver crawler on the market! There is nothing like it! The long, wide design gives the lowest possible ground bearing pressure. The ball and socket action of tread and roller keeps the full face of the tread on the ground, assuring better weight distribution. Lugs on alternate tread shoes make possible a self-cleaning action that throws dirt out of the roller track. Tread joints are smooth and close fitting, eliminating the "nut cracker" action that chips treads. Tread pins are of the floating type and give free action, long life and make replacement easy.

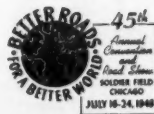
Here is a paver crawler that will mean trouble-free service and keeps the big machine light on its feet with minimum damage to shoulder or subgrade. This feature alone, not counting other advantages and the long record of unusual performance, makes the MultiFoote worth looking into. There is no obligation in asking for further details.

THE FOOTE COMPANY, INC.
1916 State Street Nunda, New York



MULTIFOOTE CONCRETE PAVERS
ADNUN BLACK TOP PAVERS
Kinetic ASPHALT MIXERS

Ask about the
Adnun Black Top
Paver, the only
paver of its kind
that will lay black
top, stone and
cinders.



Equipment Distributor Doings

Business Conditions As Reported by AED

Distributors of construction equipment throughout the United States are uniformly optimistic that business will remain at a continued high level throughout the remainder of 1948. This consensus was indicated by a nationwide survey which the Associated Equipment Distributors conducted among its members. The results of the survey were announced by A. F. Garlinghouse, President, in an address before a regional meeting of members from Georgia, Florida, Alabama, Tennessee, and South Carolina.

Among the causes for this optimism, Mr. Garlinghouse stated, is the fact that, except for railroads, contracts are now being awarded for municipal, state, and other work in rather substantial volume.

Railroads were reported comparatively inactive during the first quarter of 1948 in awarding construction contracts in Pennsylvania, Iowa, Missouri, Nebraska, Kansas, California, Nevada, Arizona, Arkansas, Mississippi, and Louisiana. The state highway program was reported disappointing in New York and New Jersey, and was lagging behind in Wyoming, Colorado, New Mexico, and Utah. But in all other areas, distributors reported that contracts are being awarded in all classifications, with large industrial expansion increasing the total volume considerably in some states.

At the end of the first quarter of the year, contractors were reported generally busy throughout the nation. For the most part, they expect to be increasingly busy during spring and summer months.

The delivery situation seems to be considerably improved on most lines, except for crawler tractors and motor graders. Production on most construction machinery has caught up with demand.

Distributors' inventories are unbalanced in many states, with an evident tendency towards excessive inventories on all but a few items in the heavier lines. Abnormally large inventories on certain lines are reported by distributors in more than half of the states, although a general movement towards the reduction of large stocks of highly competitive lines is apparent.

As expected, there is a trend towards an increased volume of trade-ins as deliveries continue to improve, though some of the states have not yet felt this increase appreciably. It is noted that trade-ins, while apparently on the increase, as yet have had little effect on the market. Southern and western states seem to be particularly affected in this connection, with estimated increases of trade-ins ranging to 100 per cent over 1947. Distributors in many states place the increase at approximately 50 per cent.

A definite tightening of credit, on the part of distributors and their banks and financing companies, was reported from every area. Collection experience varies somewhat throughout the nation, with many distributors indicating that collections are somewhat slower. In some cases, contractors are picking up last winter's delinquent accounts as new 1948 contracts are awarded.

Canadian distributors, faced by the embargo on construction equipment, have rather large inventories at present, and have experienced a tightening of credit and a slowdown in collections.

Trade-ins are increasing to some extent, with an improvement of deliveries on most items. The Provinces are beginning to award 1948 contracts, with the Hydro Electric Power Commission at present working on over \$300,000,000 worth of contracts. In general, contractors are busy with carry-overs from 1947, and business conditions are very good throughout Canada.

Va. Dealer's Open House Attracts Over a Thousand

The Bemiss Equipment Corp., of Richmond, Va., recently held an open house to which all contractors in the area were invited. More than 1,000 guests turned out for the occasion, including the Honorable William M. Tuck, Governor of the Commonwealth of Virginia. S. Merrill (Chick) Bemiss was host. The party was held on the date of the 12th anniversary of the formation of the company.

On display were the modern parts—
(Continued on next page)



Guests at the Bemiss Equipment Corp. open house in Richmond, Va., were treated to an equipment demonstration in the display yard adjoining the Bemiss plant. Pictured in the insert is President S. Merrill Bemiss.

any way you figure it...

● Hanging overhead doors

● Awning installations

● Fastening decorative store fronts

● Hanging metal signs

● Hanging suspended ceilings

● Installing heating ducts

● Installing electrical conduits and boxes

● Installing lighting fixtures

● Attaching wood furring strips to concrete or steel

● Electrical construction installations

● Hanging acoustical ceilings and walls

● Fastening metal lathing

● Installing steel flooring and grating

● Highway-Railroad maintenance and installations

● Anchoring theatre and auditorium seats

● Steel shelving installations

● Installing cement re-enforcing strips

● Installing television antennas

● Fasten down machinery

● Install blower systems

● Installation refrigeration equipment

● Communication installations

● Attaching wire mesh for spraying liquid concrete



Look over that list of TEMPOTOOL applications again! Does your business include any of these, or similar, jobs? If so, you're in luck. By using the TEMPOTOOL method of fastening you can do them in at least half the time it formerly took—and at less than half the cost! This is no guess-work. These jobs have already been done—and are being done—every day from coast to coast. The amazing savings are a matter of written record. TEMPOTOOL is fast—yes. But more than that, it requires no cables, compressors or other expensive equipment. Think of the savings in this respect alone!

With TEMPOTOOL a powder charge supplies the power and the stud does the rest. A wide selection of studs—threaded and unthreaded—are available for different types of jobs.

Write for complete details.

Distributed Nationally by

THE TEMPO PRODUCTS COMPANY
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Manufactured by

STEMCO CORPORATION • Rocky River, Ohio

FASTENS STEEL TO STEEL
FASTENS STEEL TO CONCRETE



Distributor Doings

(Continued from preceding page)

department stock room, the enlarged parts department, the shop facilities, and the showroom with a display of new models of equipment. The day's activities included a luncheon and supper.

Among lines handled by Bemiss are those of the Allis-Chalmers Mfg. Co., Detroit Diesel Engine Division of the

General Motors Corp., Chicago Pneumatic Tool Co., Mixermobile Manufacturers, Inc., Eagle Crusher Co., Gar Wood Industries, Inc., Seaman Motors, Inc., Bucyrus-Erie Co., and others. A Bemiss branch is maintained at Roanoke, Va.

New Oregon Headquarters

Howard-Cooper Corp. dedicated a new headquarters building in Portland, Ore., last May, with open-house hospitality. The company distributes and services construction equipment throughout Oregon and western Wash-

ington.

The new building occupies a 5-acre site at N. E. Glisan and N. E. 60th Streets, and affords 56,000 square feet of floor space. It is constructed of reinforced concrete and has built-up roofs supported by ring-connected trusses to provide headroom for all types of equipment.

Howard-Cooper Corp. is headed by Frank R. Cooper, President; William A. Wylie, Executive Vice President;

Gordon S. Yerby, Vice President; Miss E. C. Lundquist, Secretary-Treasurer; and Frank S. Parker, General Sales Manager.

Davey Eastern Dealer

Evans Machinery & Equipment Co., 770 S. Schuylkill Ave., Philadelphia, has been appointed to a class A dealership by Davey Compressor Co. Its ex-

(Continued on next page)

Be Sure Your CONCRETE IS CURED



- Lyons & Lyons are pioneer designers of canal curing and joint filling equipment for Bureau of Reclamation Projects.
- Lyons & Lyons furnish the efficient concrete curing service desired by prime Contractors & Bureau Engineers.
- Lyons & Lyons for the past 18 months have applied SURE CURE CONCRETE CURING COMPOUND on over 25,000,000 square feet of canal lining in the Coachella and Central Valley projects—more than all other pigmented compounds put together.
- Lyons & Lyons SURE CURE CONCRETE CURING COMPOUND was used on the following Bureau jobs:

1. J. F. SHEA CO., INC., Coachella Valley
2. PETER KIEWIT SONS' CO., Central Valley
3. MORRISON-KNUDSEN CO. & J. F. SHEA CO., Coachella Valley
4. HUBERT H. EVERIST, Central Valley
5. ARIZONA-NEVADA, Central Valley
6. OTTO B. ASHBACH, Coachella Valley
7. MORRISON-KNUDSEN & HASLER, Central Valley

STEVE FRANK
LYONS & LYONS
CONCRETE CURING

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Throughout the world's largest industries, institutions, and transportation facilities, millions of feet of Plastic Rock are positively proving its ability to stand abuse. Plastic Rock units come proportioned accurately and packed complete in handy

barrels for easy application; new floor for old in 48 hours without expensive removal of old surface. Noiseless, flame-repellent, skid-safe even when wet, dustless; no cracking, curling, crumbling, or loosening.

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LABORATORIES, Inc.
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PRODUCTS AND PROCESSES
for PROTECTING PROPERTY

Field Representatives All Over The World



with Silver STEERING BOOSTER

Fingertip pull on clutch steering levers opens clutches FULL TRAVEL. Ends frequent repairs to clutches, throwout bearings and brakes. Skinners do more and better work because angle-dozing, following contours and steering big crawler tractors does not mean sore muscles and exhaustion at the end of the day. For all crawler tractors. Installed on approval by your dealer.

Silver BOOSTER MANUFACTURING CO.
1406 SOUTH GRAND AVENUE
LOS ANGELES 15, CALIFORNIA Richmond 6191

Know WHY + Know HOW = ON THE JOB DESIGN

Typical unit designed to do a particular job is this Marion 20-ton, 26-yard capacity body DHD-260 mounted over model 723-T twin telescopic hoist. Body measures 20' long by 96" wide with 54" sides and 60" ends, and is one of the fleet being sent into the West Virginia Coal fields.



Each Marion Body and Hoist is designed under actual work conditions by field-experienced engineers. Marion combines first-hand "know-why" with first-hand "know-how" to produce equipment ready to tackle your "toughest" hauling or dumping job. For literature, prices and further information, write direct or to your nearest Marion Distributor.

MARION
DUMP BODIES and
HYDRAULIC HOISTS

**MARION METAL
PRODUCTS CO.**

MARION, OHIO

clusive territory will include the following Pennsylvania counties: Chester, Montgomery, Bucks, Delaware, and Philadelphia; and the New Jersey counties of Burlington, Ocean, Camden, Gloucester, Atlantic, Salem, Cumberland, and Cape May.

On a non-exclusive basis, Evans will operate in the Pennsylvania counties of Tioga, Bradford, Susquehanna, Wayne, Wyoming, Lackawanna, Pike, Montour, Northumberland, Columbia, Schuylkill, Luzerne, and Carbon; and in Newcastle County, Del.

Evans will handle the entire Davey line, including Air Chief, Auto-Air, and Track-Air units; stationary compressors; Da-V-Lite portable lighting equipment; Davey mobile machine shops; Davey heavy-duty truck power take-offs; etc.

Mixer Franchises Open

Vanco Products, Inc., has territories available for dealers to handle the sale and distribution of its line of mixers

for use by builders and contractors. The mixers are made in a 3-cubic-foot size, Model 15VR, and a half-sack size, Model 25VR. They have 1½ and 3-hp engines, respectively. There are also manual models for use with separate power units.

A bulletin describing these mixers, listing their prices, and explaining the company's freight policy can be secured by writing to Vanco at 130 S. Weber St., Colorado Springs, Colo. Or use the enclosed Request Card. Circle No. 115.

Company's Service School Trains Dealer Personnel

Thus far, 165 service engineers have attended the Distributors Service School operated by The Thew Shovel Co. They traveled to Lorain, Ohio, from forty states and three foreign countries. The school is open to service engineers from Thew's distributor organization. Its purpose is to provide the best possible field service for Lorain users, and to make factory-trained

service personnel available to them.

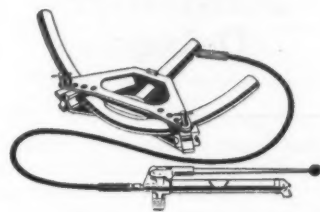
Those attending the school receive illustrated lectures, are shown slide films for studying the internal workings of the Lorain equipment, and tackle and discuss problems which have arisen in actual field operations. In addition, they perform actual service and repair on component units of the equipment.

The course is two weeks long and involves a thorough study of power crane and shovel engineering, design, construction, and service. Time is divided equally between classroom activities and actual field repair work. Sixteen classes have been conducted so far. The next class is scheduled for the autumn.

Calif. Dealer Expansion

The West Coast Engine & Equipment Co. has opened a new sales and service plant in Berkeley, Calif. It is located at 915 Ashby Ave., near the eastern terminal of the San Francisco Bay Bridge.

(Concluded on next page)



When you buy a

BENDER

...check to make sure you get these features:

EASY TO GET TO THE JOB



☒ Lightweight, portable —one man can easily take a Blackhawk Pipe Bender right to the job. Bends rigid conduit and pipe in all popular sizes, up to 4" diameter.

WORKS AT ALL ANGLES



☒ The compact hydraulic Porto-Power Ram is all-directional. Power eliminates need for heating the pipe.

WORK OVERHEAD



☒ All-directional operation and light weight enlarges range of utility to use on ladders, scaffolds and cramped quarters and work on existing pipe runs.

SIGHT FROM ANY ANGLE



☒ Remote control permits operator to stand in any position for a full view of the job. Saves need for elbows, couplings, cutting and extra threading.

DETACHABLE POWER UNIT FOR EXTRA UTILITY



☒ It pulls gears, lifts machinery, and licks scores of other trouble jobs.

BLACKHAWK Porto-Power PIPE BENDERS

BLACKHAWK MFG. CO.
Dept. P-1878 Milwaukee 1, Wis.
Mail Hydraulic Equipment catalog to:

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Jenny
CLEANS

STEAM
CLEANER

CONSTRUCTION EQUIPMENT

8 to 10 Times Faster

Increases "On-The-Job" Efficiency
Cuts Repair Time As Much As 40%
Saves Time · Labor · Money



Accumulations of mud, dirt, and grease on construction equipment, impair the working efficiency of both men and machines. Cleaning with scraper and hose, and scrubbing with gasoline is time-consuming, expensive and often a hazardous operation. Yet cleaning—thorough cleaning—of all types of equipment, can be done quickly, safely and inexpensively with Hypressure Jenny Steam Cleaner. One man using Hypressure Jenny, can clean more equipment in a single hour than ten men can accomplish in the same time by hand methods.

JENNY speeds repair time, too. For actual time studies reveal that when machines needing repair are first steam cleaned with Hypressure Jenny, 40% of your mechanics' time is saved which otherwise would be wasted wiping dirt and grease from tools and equipment.

We will be glad to send you, without obligation, complete details on how Hypressure Jenny Steam Cleaner can save you time, labor and expense on all your cleaning jobs.

Write today.

HYPRESSURE JENNY STEAM CLEANER

... is a self-contained, compact, portable unit easily moved from one cleaning job to another. Cleaning is accomplished by a highly atomized mixture of steam, hot water and cleaning compound applied under pressure through an adjustable spray nozzle. Hypressure Jenny is so safe and easy to use that ordinary labor can operate it.

HYPRESSURE JENNY DIVISION

HOMESTEAD VALVE MANUFACTURING CO.

P. O. BOX 30 · CORAOPOLIS, PA.

Distributor Doings

(Continued from preceding page)

The new plant covers approximately 4,000 square feet and includes general offices, parts department, shop, and showroom. The organization is headed by Muirson C. Wright, James R. Williams, and Eugene R. Rhea.

Lines handled by West Coast include General Motors Series 71 diesel engines, Nordberg marine gasoline engines, Willard batteries, and U. S. Motors light plants.

Beckwith Names Samuelson

Beckwith Machinery Co., equipment distributor of Pittsburgh, has appointed L. E. Samuelson General Parts and Service Manager. In his new position—he was formerly Purchasing Director—Mr. Samuelson will coordinate and direct the Parts and Service Departments at Pittsburgh and Bradford, Pa., and in a proposed branch at Clearfield.

Sales Engineer for Perin

James W. Lafferty has been named Technical Sales Engineer by the Ira G. Perin Co., San Francisco distributor of materials-handling equipment. Mr. Lafferty is assigned to the Los Angeles office, and will serve accounts in southern California. Lines handled by Perin include Elwell-Parker power trucks, Electric Wheel trailers, Powell pressed-steel containers and platforms, and Hillwood Helyx drive screws.

Dealers for Protex Wanted

The Autolene Lubricants Co. announces that it is establishing a national organization for the distribution of its air-entraining agent, Protex. Dealers interested in handling Protex should write directly to the company at 1331 W. Evans St., Denver 9, Colo.

Protective Coating For Brick, Masonry

A protective coating for use on concrete, brick, and other porous masonry surfaces has been developed by International Aquella Products, Inc., Rockefeller Center, New York, N. Y. Aquaphane is described as a transparent non-inflammable coating, and is applied by brushing. It is an opaque water emulsion of a semi-plastic nature, and consists of highly dispersed water-repellent organic ingredients.

Aquaphane is stable at temperatures of from 40 to 160 degrees F, but the manufacturer recommends that it be stored at temperatures of 50 degrees or higher. Among the features claimed by the manufacturer are these: it is non-toxic; it can be applied to either a moist or dry surface; and it will not peel, dust off, blister, or bloom. After application, it is said to withstand temperatures as high as 212 degrees.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 29.

Air-Powered Starter

Air starters for use with gas, gasoline, or diesel engines can be secured from the Gardner-Denver Co., 102 Wil-

liamson St., Quincy, Ill. These starters are now made in five sizes, developing from 3 to 15 hp on 100 pounds of air pressure.

High torque and the elimination of battery maintenance and replacement are among the advantages claimed for this starter. The high-torque characteristic of its piston-type engine makes it especially desirable for diesel applications involving high starting loads, the

manufacturer states, while the 5-cylinder radial design provides even torque throughout the operating cycle.

An air-actuated starter pinion, designed to engage the ring gear automatically a split second before the starter begins to crank the engine, is a Gardner-Denver feature.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 16.

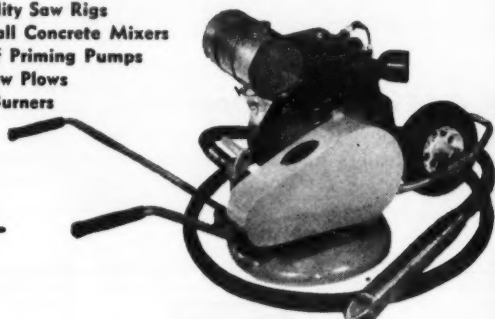
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Asphalt and Tar Kettles Utility Saw Rigs
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The first of a Series in the interest of more efficient use of steel... a vital American resource.

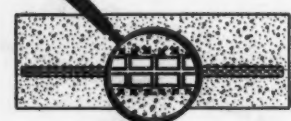
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DESIGN and STRENGTH
MULTI-RIBBED for MAXIMUM ANCHORAGE
HIGH STRENGTH for STEEL-CONCRETE SAVINGS



Old type reinforcing bars depend on localized anchorage.



Multi-Rib improved bars distribute anchorage and loads.

"30 years ahead of the building codes"—that's the verdict on the Laclede Multi-Ribbed Reinforcing Bar. All tests show that the long sought balance between high strength and adequate anchorage has been achieved. The combined factors of high yield point (in excess of 55,000 PSI) plus improved deformations give greater reinforcement strength and provide a more efficient use of steel... conserving America's most important resource while effecting material savings on the job.

Laclede bars meet ASTM Specifications A305-47T, for improved reinforcing bars, developed in the interest of modern, efficient use of steel.

Write us about specifying Laclede Multi-Rib bars on your jobs.



LACLEDE STEEL COMPANY

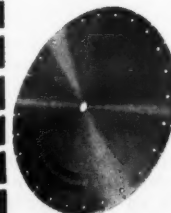
St. Louis, Mo.



Features:

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Less vibration, greater power.
POSITIVE WATER TURN-ON.
Insures against dry wheel operation.
HYDRAULIC DOWNFEED RETARDER.
Eases diamond blade into concrete. No sudden shocks.
DOUBLE END SPINDLE.
For right or left hand operation.
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PRECISION BUILT.
Engineered and built by DI-MET to insure maximum DI-MET diamond wheel performance. More power to spindle means constant cutting speed, longer wheel life.

NET WEIGHT 466 LBS.
SHIPPING WEIGHT 600 LBS. MAX.



DI-MET CONCRETE CUTTING WHEELS

For longest wheel life and fastest cutting use Felker DI-MET Segmented Concrete Cutting Wheels... the blades with the holes and slots. Designed for greater coolant circulation, freer cutting.
6" to 18" diameters.
6 1/2" max. depth of cut.

Write for further information.

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World's Largest Manufacturer of Diamond Abrasive Cut-off Wheels and Equipment
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**U. S. SECURITY BONDS are a good investment
BUY THEM REGULARLY**

Bridge Foundations For Urban Expressway

(Continued from page 6)

& Root, Inc., to perform this work. McKinney has done four of the first five overpass projects. His subcontract includes only the drilling and under-reaming, with concrete work retained by Brown & Root, Inc., the prime contractor.

Older Rig Builds First Piers

The first work on the project was done by an older type of rotary drilling rig. But a description of it is purposeless because of "Big John the Conqueror", a new rig which McKinney has since developed and used. The older rig was quite heavy and cumbersome. It was tractor-drawn and had 40 feet of kelly bar to play on. Despite its heavy-duty nature, which made it a little difficult to move around, highway officials were pleased with its performance of about six completed holes per 9-hour day.

"Big John the Conqueror"

This rig soon gave way to an improved, lighter, more mobile drilling machine. It was built and assembled in the shops of Hugh B. Williams of Dallas, and appropriately tagged with a name plate of genuine high-grade brass carrying the impressive Texas monicker of "Big John the Conqueror".

Big John can drill holes as deep as 30 feet. The rig is mounted on a Mack truck, and can travel to and from a job at ordinary highway speeds. It has a 40-foot collapsible tubular steel derrick, which can be raised in less than a minute by dual worm pin drives. The kelly bar, or drive shaft for the rotary-drill auger,

is 3 inches square and made from the highest-grade chrome Vanadium steel. The rig has about 600 pounds of down pressure available on the kelly bar to drive the auger in hard material, or to expand the wings of the reamer.

The main drive power for the drill comes from a 60-hp Continental Red Seal engine, mounted near the truck cab. This engine drives the rotary table and the other various mechanisms. Power is transferred to the rotary table through a dual set of 14-inch Twin Disc clutches. There are four forward speeds and one reverse speed available at the rotary table, and it is virtually impossible ever to stick a drill auger.

Another feature of this rig is its leveling provisions. To drill a hole perfectly plumb, it is necessary only to level the truck with the long axis. The derrick can then be raised or lowered a trifle to level the equipment the other way. No leveling delays were encountered when Big John hit the job.

According to the driller, this rig has dug bedded blue shale with ease, and can handle gravel or relatively hard rock. Sturdy self-hardening welding rod is used to hard-face the cutting edge of the bit. Sometimes Tube Borium is also employed.

This rig has set records of nine 25-foot holes in a 9-hour shift, which is quite impressive when one considers that seven completed holes finish one bent.

Drilling Methods

To drill a hole, the rig moves in and spots itself on the stake which marks the surveyed location. The derrick is raised, and the auger goes to work. As the hole goes down, inspectors take samples of various materials and make a rough log of the hole by recording

the types of materials and the depth at which they were encountered.

The excavated dirt builds rapidly all around the hole, and when the machine is working at top speed a small Ford rubber-tired tractor with a front-end shovel is used to keep the dirt moved away. The auger drills about 2 feet before it has to be raised and the dirt discharged.

Various strata of materials, ranging from topsoil through a layer of water-bearing sand, are generally found. The gulf-coast area is sedimentary, and the various layers are relatively uniform. When the first thick upper layers of the native Beaumont clay are found, the driller and everyone else around the rig immediately recognize it by its dense reddish-brown appearance. This clay will support about 5 tons to the square foot.

The main thing to determine at that point is whether the material will stand the inverted slope induced by under-reaming. A lens about 4½ feet thick is necessary to accommodate this under-

reaming. In that distance the bottom of the drilled hole is flared from 30 inches in diameter to 6½ feet, to form the base of the concrete pedestal.

Excessive cave-ins, of course, are costly to the contractor. Specifications provide for payment by the linear foot of column, plus the amount of pedestal concrete out to a neat line as shown on the plans. If minor cave-ins do occur, they are filled with concrete at the contractor's expense when the columns are poured.

Once the hole attains its depth to firm bearing material, the rig drops its drill auger and picks up a special tubular reamer. This device has two cutting wings which flare out from the base when down pressure is exerted on the kelly bar. The width of flare can also be adjusted.

With wings collapsed, the device is lowered to the bottom of the hole and pressure applied. The wings flare out, the cutting edges bite off a mushroomed pedestal foundation, and the dirt enters

(Continued on next page)

Eliminate Back Breaking Effort ON CONSTRUCTION JOBS



WITH

DUFF-NORTON JACKS



Many heavy lifting, back breaking construction jobs are made easy with Duff-Norton Jacks. Contractors use them for loading and unloading heavy equipment, bracing and shoring sections, lifting and holding plates for welding or riveting, repairing mobile equipment, tearing down old structures and unlimited other applications.

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THE WORLD'S OLDEST AND LARGEST MANUFACTURER OF LIFTING JACKS

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TAGLINES

Provides positive, steady tension—holds buckets steady under all working conditions

A silent, efficient, and dependable worker on all jobs—RUD-o-MATIC Taglines are used as standard equipment by most crane manufacturers. The spring tension is powerful enough to hold a clam shell bucket steady under the roughest and toughest of conditions. Operates perfectly with boom at any angle. Compact—it can be installed in less than thirty minutes. There is none of the trouble found with the average tagline for there are no pins, weights, tracks, or carriages to wear or be replaced, and fewer sheaves make for a definite saving in cable wear. The RUD-o-MATIC Tagline is available in eight models, each designed and built with the desired tension for various bucket sizes. Taglines are complete with fairlead U bolt clamping plates, and cable attached. Immediate delivery—see your equipment dealer—or write—



RUD-o-MATIC MAGNET REEL AND TAGLINE COMBINATION

INCREASE MAGNET CABLE LIFE

The electric cable cannot jerk or pull loose from its terminals—tangle or snag. Spring tension steadies the magnet. Both cables feed together with tension on the tagline cable and slack on the electric cable. Used as standard equipment by most crane manufacturers—available in 5 models to fit your needs.

*DEALERS—a few selected territories in the midwest and northwest are still open. Write for all details.

McCAFFREY-RUDDOCK *Tagline* CORP.

2131 EAST 25th STREET, LOS ANGELES 11, CALIFORNIA

Bridge Foundations For Urban Expressway

(Continued from preceding page)

the body of the reamer. It is pulled up and emptied several times in the process of reaming a hole.

Men then descend to the bottom of the hole, make their inspections and tests of the base material, and clean up any loose dirt still lying around. No loose dirt is permitted. Obviously, if foundation soils with proper stability and moisture content are selected, there is little likelihood of caving or raveling.

It ordinarily requires about a minute per foot of hole for drilling. The crew has but three men: a driller, his helper, and a Ford tractor-loader operator who keeps the dirt moved out of the way.

First-Stage Concrete

As soon as McKinney's drill rig moves out of the way, the concrete crew of Brown & Root moves in. No ground water is allowed to accumulate. The

prefabricated cage of steel reinforcement, previously made on jigs at a central point, is lowered in place by an Insley crane. Spreaders secure it to insure clearance from the sides of the hole. A stub steel form, 24 inches high, is then set in place to form the column to true alignment at ground level.

From practical as well as aesthetic standpoints, it is important that this steel form be exactly on location, with no tolerances. It is therefore checked for line both ways by transits. By building the column true at this point, the men have a permanent reference point later for steel forms which follow.

A casual visitor can select any overpass at random for his inspection, and look down the lines of columns lengthwise, crosswise, or diagonally. No column is out of line to the eye. It is an uncanny piece of accuracy. But there it is.

Truck-mixers, mostly new Jaeger Dual-Mix units, then bring concrete in from the W. D. Haden Co. plant about a mile away. The truck-mixers dis-

charge to a 1-yard transfer bucket, and the concrete is chuted down through an elephant trunk. The Insley crane does the lifting. Methods on concrete will be detailed a little later, under the next subheading.

Column Forms and Concrete

Construction of the steel forms for

concrete work on the exposed columns caused Project Superintendent Howard Payne the most apprehension of all, according to his own admission. For some time he had searched for a simple, stable, foolproof forming method for the tall columns.

He found the answer in a cylindrical (Continued on next page)

Briggs & Stratton Workmen Are Proud of Their Engines



*Air-Cooled
Power

Refined
Power
FOR INDUSTRIAL
CONSTRUCTION
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At Briggs & Stratton every effort is aimed at building the world's finest single cylinder, 4-cycle gasoline engines. The craftsmen who build them put more than skill and experience into their work. They are proud of the care and exactness they put into each engine.

Briggs & Stratton air-cooled engines deliver dependable power, stamina, and performance — the RIGHT power to meet the most exacting requirements. America's choice for 30 years.

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Attend WISCONSIN CENTENNIAL EXPOSITION, Milwaukee August 7-29



No.	O.D. Exhaust	Retail
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2	2 3/8"	1.90
3	2 3/4"	1.90
5	1 7/8"	1.90
55	2"	1.90
5x	1 3/4"	1.90
6	1 1/2"	1.90
66	1 3/8"	1.90
7	2 1/2"	1.90
8	3"	2.50
9	3 1/8"	2.50
10	3 1/4"	2.50
11	3 1/2"	2.75
115	3 3/4"	3.00
12	4"	3.00
123	4 1/8"	3.00
125	4 1/4"	3.00
14	4 1/2"	3.00

STOPS MOISTURE FROM FALLING INTO TRACTOR EXHAUST... Just slip the "RAINCAP" over the open end of your tractor exhaust, and you eliminate forever the danger of moisture falling into the exhaust, injuring your tractor.

THE CAP THAT DOES NOT FORGET TO CLOSE... Completely automatic—the "RAINCAP" is counter-balanced to open when the tractor starts and close when it stops. Rust proof—made of cast aluminum with bronze bushing—can be installed in two minutes. F.O.B. Waterloo, Iowa.

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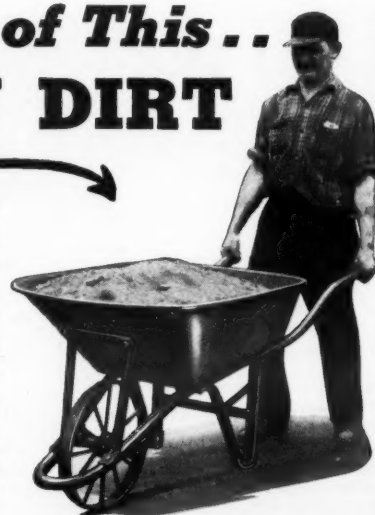
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Whether in the Klondike or on one of your everyday material handling jobs... every load is "PAY DIRT" in a Sterling Wheelbarrow. This efficient, low cost method of material transport earns extra profits. Balanced design relieves the operator of 80% of the load... assures faster, easier wheeling of heavy loads. Sturdy, all-steel construction prolongs the life of the barrow. Try a Sterling Wheelbarrow for your next material handling job. You'll find it pays off in profits.



Sterling Tubular Framed Barrow — all-welded, no rivets, lapped at corners. Steel reinforcing rod around top edge.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Sterling
WHEELBARROWS



Look for this Mark of
STERLING Quality

steel shell, without hinges, made of cold-rolled steel 3/16 inch thick. The only method Payne proposed to break the forms loose from the concrete consisted of two steel lips welded at right angles the length of the forms, and slotted for take-up keys about every 16 inches. Payne calculated that a strong pry from a crowbar would spring the steel shell open.

Many a man told him he was wrong. His practical associates said you never could strip the thing, and that was that. His theorizing associates pointed out that the pry would only increase the shell circumference on the front half of the column, and that frictional inertia would . . . well, you get the idea. They too said it simply couldn't work.

"When about 30 different fellows, whose opinions you respect, tell you a thing is wrong, it's time to wonder", Payne said, grinning. "Frankly, I was wondering."

But he went ahead and had the first forms rolled to shape at the Brown & Root shipyard at Houston. Steel flanges with bolt holes were welded to the cylinders, so they might be made up in sections to the proper height of varying columns. The finished forms were checked inside to no tolerance with a template, to be sure they were all the exact size. Then the first ones were taken out to the job and tried. The truck-mixers came in and poured them full of concrete.

All night Payne wondered. Would he have to blast? Would he have to cut them off with burning torches? Would he have to bring in Paul Bunyan's sky hooks and go to work? All these possibilities had been suggested, with varying degrees of sarcastic humor.

Two men stepped up to the form with hickey-bars. The take-up keys were loosened. Two easy prys were made. The front of the form loosened all along the vertical flanges. A few hard blows with a sledge hammer, using care not to strike the keys, and the whole form sloughed loose. An easy lift by the Insley crane, and the experiment was a success.

All was not quite so easy as the last two paragraphs make it seem, however, because of the preparatory alignment work and bracing. A steel template, with wood blocks which fit the steel form shells at the exact location of the columns, had to be made. Cable bridges on this template make it easy to set in place with a crane. The top of the template is covered by a wood working platform the entire length of one bent of columns.

When this template is in position, each column top is right for spacing. A transit check determines how far the top has to be pulled one way or another to bring it on line. Cable X-braces, secured by turnbuckles, make this adjustment.

When the top has been aligned one way, turnbuckled cables from the template go out at right angles to deadmen, angled in the ground by post-hole diggers. The top is then checked for final alignment both ways, with the template in position.

When the pours are made, all cables are taut in all directions, and the columns cannot move. Once in a while a concrete bucket jostles the top platform, and in that case Brown & Root's surveyors who work under "Red" Salmons, Chief Engineer, are there to check again on alignment.

Concrete from Jaeger Dual-Mix truck-mixers then comes in to the job,

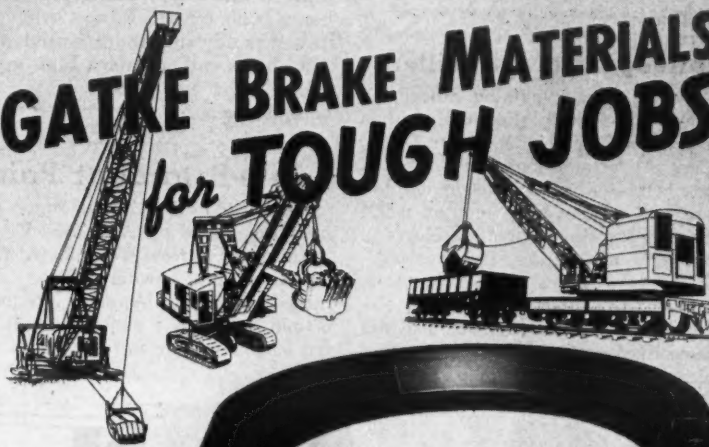
is transferred by a 1-yard Blaw-Knox bucket on the Insley crane to the hopper at the top of the pour, and goes down through an elephant trunk to the previous poured part of the column. Care is used even on the hopper set-up. It does not touch the steel reinforcement or the steel forms. It rests on legs on the wooden working platform.

An internal vibrator, driven by a portable Ingersoll-Rand air compressor, consolidates the fresh concrete around the steel and the forms. Men pour a 25-foot bent in about 25 minutes. Often a 7-column bent is poured in 2 hours.

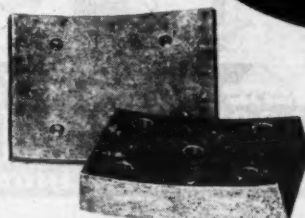
The forms stay in place from one to two days, ordinarily, and are then stripped. They are no sooner in the clear than a wood scaffold is set in place, and men begin to dress the green concrete with Carborundum hones and cement. This dressing removes all form joint marks, fills up the tiny air pockets, and gives the columns a neat surface. It is expected that a final dressing will be done just before the job is accepted, but the first dressing has resulted in beautiful architectural concrete.

The long beam across the top of the
(Concluded on next page, Col. 2)

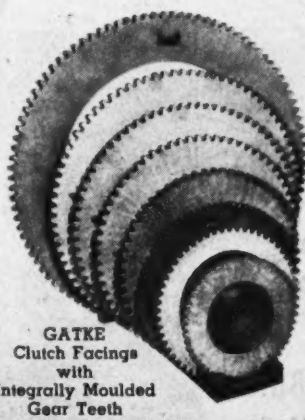
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Tremendous Power—no let down when things get hot.

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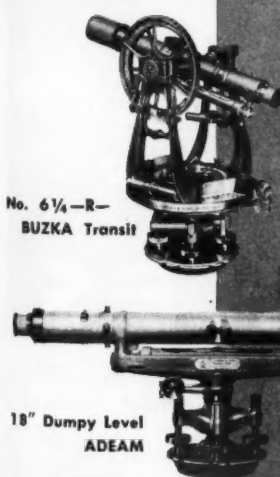
Whatever the application, send for the GATKE Recommendation.

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18" Dumpy Level ADEAM



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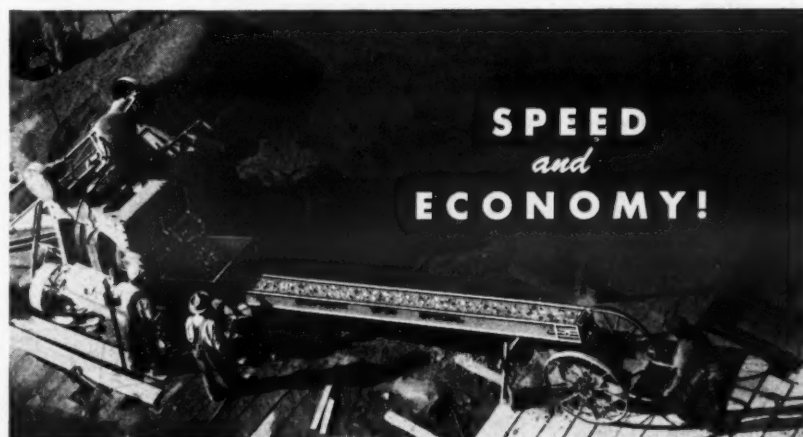
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Catalog Lists Air Filters

A 2-color 8-page catalog describing its line of dry-type intake air filters has been prepared by the Dollinger Corp., 20 Centre Park, Rochester 3, N. Y. These Staynew filters are recommended for use on all types of air compressors, diesel or gasoline engines, blowers, motors, and generators, the manufacturer states.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 64.

Bridge Foundations For Urban Expressway

(Continued from preceding page)

columns is then formed with pre-fabricated sections, lined with Masonite, and set in place. These forms rest on underpinning, and are held to line by adjustable tie bolts. These bolts also act as spacers, since they have screwed plates. They were made up at the shipyard of the contractor, Brown & Root, in Houston.

In the first five overpass structures on the job, some 840 columns were built in this way, making 120 complete bents. The unique design which permitted rapid work underground, despite rain, bad weather, and a high groundwater table, was a part of the secret behind this speed.

Fire-Retardant Paint

A fire-retardant coating material has been developed by Albi Mfg. Co., Inc., 9 Park Place, New York 7, N. Y. It is supplied in a powder form which is mixed with water. Applied like paint, it is said to dry to a white, smooth, hard, flat surface which will not dust or peel.

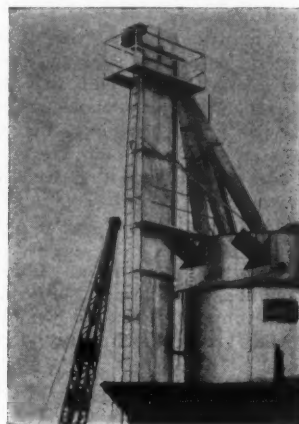
When exposed to flame, the coating is reported to develop an insulating blanket which prevents flame spread and reduces heat penetration to and through the coated surface.

The manufacturer explains that Albi-"R" can be covered by any oil paint, enamel, or lacquer, and recommends

this step where frequent washing is required. Albi "R" is listed by the Underwriters' Laboratories, and also meets the slow-burning classification of Federal Specification SS-A-118.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 35.

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BIN-DICATORS, properly applied, will effect savings equal to many times their cost by preventing overflows and burned out conveyor motors due to the clogging of the conveyor. They also eliminate the need of an operator to observe the filling and emptying of each bin. Standard and special models are designed to meet almost all specifications. Send for free illustrated catalog.

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ABOVE, the early model Dieselectric Plant in use at the Midwest Pre-Cote Co. BELOW, another view showing how it is arranged for tank-cooling. . . .



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ROCKFORD CLUTCH DIVISION

314 Catherine Street, Rockford, Illinois, U.S.A.

SEE OUR "TRADING POST"? . . . TURN TO PAGES 142 & 143

Road-Building Equipment Is Described in Catalog

A broadside describing some of its line of road-building and maintenance equipment has been prepared for distribution by Littleford Bros., Inc., 485 E. Pearl St., Cincinnati 2, Ohio. Bulletin WP-447 features a description of the Littleford utility spray tank. Also covered are the Model No. 84-HD road-

maintenance kettle, the Littleford Trail-O-Roller, and emulsion sprayers.

The folder illustrates these units, and points out some of the recommended uses for each. On-the-job photographs show their features of operation, and text describes their features of construction.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 14.

There's DIGGING POWER in a Jiffy

JIFFY BUCKETS for all standard type TRENCHING MACHINES... designed for MAXIMUM PERFORMANCE—GREATEST ECONOMY OF OPERATION...

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- Eliminate the necessity of carrying in stock a different router for each type of machine.
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JIFFY ADAPTERS are available for all standard types of buckets.

SELF SHARPENING

QUICK CHANGE

FAST

Jiffy Products Company

Phone Taylor 9567
4325 Elm Street Dallas, Texas

Wood-Preserving Paint

Publication of a booklet describing the features of Woodrem wood-preserving paint is announced by Speco, Inc., 3142 Superior Ave., Cleveland, Ohio. This paint is said to seal and preserve wood against rot and decay.

The booklet points out how the creosote content of Woodrem works to kill wood-destroying bacteria, how the paint is applied, its physical characteristics, and other data.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 120.

TESTED AND

Accepted!



1 HORSEPOWER

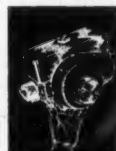
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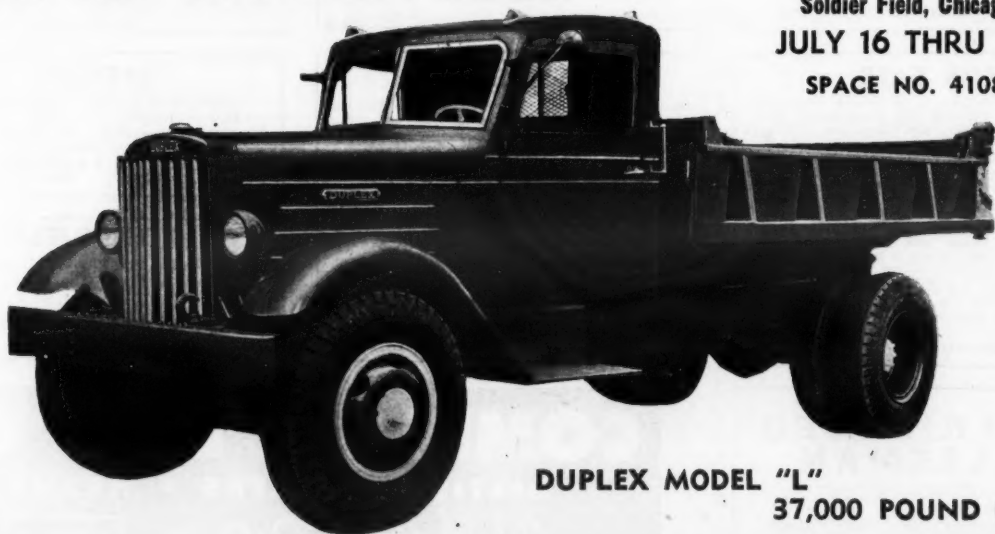
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Clam Shell Bucket, single line, 1½ yd.
Speed Reducers, 100 HP & 250 HP.
Bread mixer, Peerless, size 5; Refrigerated with 20 HP and 1½ HP motors. 2 lathes 18" x 8" with 3/60/220 motor drives. 1 McCabe 20", 48" x 14" lathe with 3/60/220 motor. 3 vertical milling machines No. 2 Milwaukee, one with motor in base. 1 horiz. boring mill, 3" bar, single pulley dr. 1 Coal Pulverizer, size 30". 1 Loading Machine, Myers Whaly No. 4, heavy duty for rock or coal.

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- 2—Caterpillar No. 10 Patrols, dual tires, good condition
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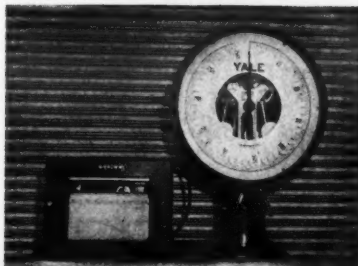
WANTED

Sledge Wedge crusher or similar. Roll crusher or wet pan crusher for ten mesh passage.
Belt conveyors, about 80 foot.
Bins—3 deck screen.
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